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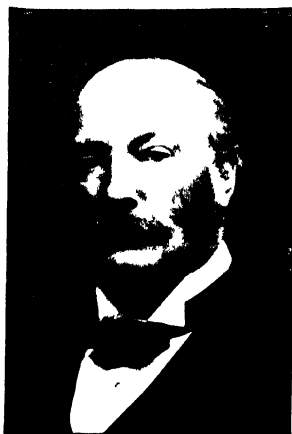
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THE NEW
POPULAR ENCYCLOPEDIA

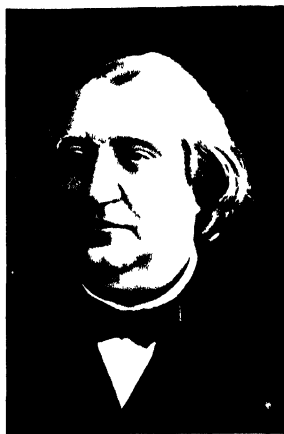
PORTRAITS OF MEN OF THE TIME XII



Lord Ruffell



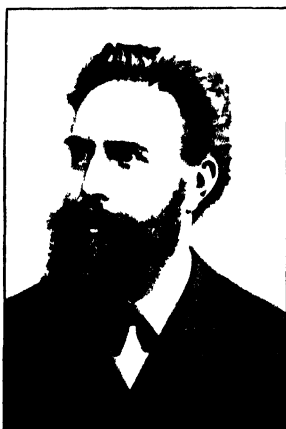
Samuel



Ernest Renan



C. P. Ruffell



W. K. Fountin



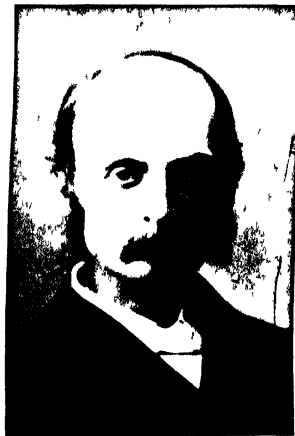
Lord Roschery



John Ruffell



Lord Salisbury



Professor A. H. Sneyd

* The portraits are from photographs by Messrs. Elliott & Fry, with the exception of Renan (Proux Paris), Ruffell (Linde & Co. Berlin), Lord Roschery (G. Jerrard London, W.) and Lord Salisbury (Timbert Weston & Son, Dover).

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Assisted by
MANY SPECIALISTS
IN
THE VARIOUS BRANCHES OF HUMAN KNOWLEDGE

Volume XII

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LIST OF PLATES AND MAPS.

VOLUME XII

	Page
PORTRAITS OF MEN OF THE TIME - - - - - <i>Frontispiece</i>	
REPTILES—I Tortoises and Turtles, Crocodile, Alligator, &c - - - - -	70
Do II Serpents and Lizards - - - - -	70
RHODODENDRONS—Alpine Rhododendrons in Tyrol, in Colour - - - - -	98
RIFLE—Rifles used in the British and other armies, Mortar, &c - - - - -	114
RIVERS—Comparative Lengths of the Rivers of the World, in Colour - - - - -	125
RODENTIA—Rodents or Gnawing Animals Squirrel, Beaver, Mouse, Rat, Porcupine, Hare, &c - - - - -	140
SAWING MACHINERY—Various forms of Machine Saws - - - - -	335
SCOTLAND—Map of - - - - -	391
SCREW PROPELLER—I Single-Screw Propeller, in Position - - - - -	416
Do II Twin-Screw Propeller, in Position - - - - -	416
SCULPTURE—I Early Varieties Egyptian, Hindu, Persian, Etruscan, &c - - - - -	421
Do II Greek the Belvidere Apollo, the Venus de Medicis, the Dying Gladiator, &c - - - - -	422
Do III Modern Examples of Canova, Flaxman, Thorwaldsen, &c - - - - -	424
Do IV Modern Examples of Gibson, Foley, Rauch, &c - - - - -	424

SELECT PRONOUNCING LIST

OF ENTRIES IN VOL. XII.

KEY ā as in fate or in fare, ä as in far (sometimes short, sometimes long), a as in fat ā as in fall, ē as in me, e as in met, é as in her, i as in pine, i as in pin, ô as in note, o as in not, ô as in move, u as in tube, u as in tub, ŷ as in bull, ù, the French u (sometimes short, sometimes long), ou as in pound, ch as in chain, h as in Scotch loch, German nach, ñ as in French ton, th as in thin, th as in this, w and y always consonants, zh as z in azure or j in French jaune

Ränders, rän'ders	Remy, ré mé	Ritschl, richl	Roumania, rò mā'ni a
Bankes, rän'ké	Renaix, ré nā	Rive de Gier, rêv dé zhyā	Rousay, rou'sa
Banz des Vaches, rānz dā	Renan, ré nān	Riviera, riv i a'rā	Rousseau, rò sô
vāsh	Rendezvous, ran'dā vō	Riviere, ri ver'	Rousette, rò sct
Bapin de Thoyras, rā pan dé	Rendsburg, rendz'burā	Rivoli, rê'vô lē	Roussillon, rò sē yōh
twā-rā	René, ré nā	Rizzio, rit'si ô	Roveredo rò ve ra dō
Rappee, rap pé	Renfrew, ren frō	Roanne, rò ān	Rovigno, rò vên'yô
Rappoltsweller, rāp polts vi	Rennes, renn	Roanoke, rò a nōk'	Rovigo, rò vë'gô
lër	Repoussé, ré pō'sā	Robespierre, rob es pi ār	Rovuma, rò vō'mā
Raspail, rās pāy	Reprive, re prev'	Rochambeau, rò shāh bō	Rowe, rò
Rastadt, rās'tāt	Requena, re k'a'nā	Rochefort, rosh for	Royan, rwā-yāh
Ratafia, rat-a fē'a	Requiem, rek'wi em	Rochefoucauld, rôsh fô kō	Royat les Bains, rwā yā lā
Ratan, ra tan'	Berados, rêr'dōs	Rochefoucauld, rôsh fô kō	bāh
Ratel, ra-tel'	Reservoir, rez'er vwar	Rochefoucauld, rôsh fô kō	Royer Collard, rwā j a kol ār
Rathenow, rā'te nou	Reusina, res'i nā	Rochelle, rò shell	Ruabon, rŷ a bon'
Rathkeale, rath kēl'	Restigouche, res'ti gōsh	Rochester, rosh es tēr	Ruatan, rŷ a tan
Ratisbon, rat'is bon	Rethel (town), ret-el	Roche sur Yon, rosh sür-yon	Rubasse, rŷ bas'
Ratitze, ra ti tē	Rethel (painter) ra'tel	Rochet, rosh'et	Rubeola, rò be'ô la
Ratlām, rat lām'	Retz, rā	Rochette, rò shet	Rubruquis, rô'brŷ kwis
Rattau, rat-tan'	Retzsch, rech	Rocroi, ròk rwā	Rubus, rò bus
Rauch, rouā	Reuchlin, roiā'lin	Rocco, rò kō'kō	Ruckert, rŷk'ert
Raubes Haus, rou'es hous	Reumont, roi mont	Rodentia, rò den'ahi a	Rugeley, roj li
Raupach, rou'pāh	Réunion, ra ti nī ōh	Rodez, rò das	Rugen, ru gen
Ravallac, rā vā yak	Reus ra-us'	Rodriguez, ròd rê'gez	Rugendas, rò gen dās
Ravensburg, rā venz burā	Reuss, ròs	Roermond, rôr'mond	Ruhinken, rōn'ken
Rawitsch, ra vich	Reuter, roi tēr	Roeskilde, rô'skild de	Ruhr, ror
Raynal, ra nāl	Reutlingen, roi't ling én	Rohans, rò āh	Ruhrort, rôr'ort
Raynourard, ra nō ār	Reveillé, re vel ye	Rohls, rôls	Kuvo di Puglia, rò vō dé pul
Razzi, rāt se	Revere, re ver'	Rohr, rò rē	yā
Ré, Rhé, rā	Revue des Deux Mondes, ré	Rollin, rol āh	Ruysdaal, roi'sdāl
Reade, rēd	vū dā dé mond	Romagna, rò mān'yā	Ruyter, roi ter
Reading, red'ing	Rhabdomancy, rab'do man	Romans (French town), rò māh	Rybinsk, rô binak'
Réaumur, ra ô mŷr	si	Romantini, rò mo ran'tān	Rybnick, rŷ brāk
Rebec, re bek'	Rhadamanthus, rad a man'	Ronaldshay, rò ald sha	Ryewick, rŷ'wik
Récamier, ra kā mī ā	thus	Roncesvalles, ron thes vāl'yē	Rzeszow, rahe'shof
Recanati, ra kā nā tē	Rha, re'a		
Recife, re se'fa	Rheims, rēmz, Fr pron		
Reclus, ré klū	rañz		
Recollet, rek'ô lā	Rheingau, rin'gou		
Recusants, rek'ŷ zantā	Rheostat, rò s stat		
Redan, re dan'	Rheydt, rit		
Redon, ré dōh	Rhigas, ri'gas		
Redondillas, red on dil yās	Rhinoplastik, ri'no plas tik		
Redoubt, re dout'	Rhio, Riou, ri ou		
Reebok, ra'bok	Rhodes, rôdz		
Refrigerant, rê frij er ant	Rhodope, rô'do pé		
Refugee, rêf'ŷ jē	Rhône, rōn		
Regelation, rê je la'shon	Rhuddlan, ruth'lān		
Regensburg, ra'genz burā	Rhyl, ril		
Regio, red'jō	Rhymney, rim'ni		
Regillus, re jil'lus	Rhytina, ri t'ina		
Reguna, re jŷ'na	Riazan, ri ā zān'		
Regiomontanus, rê ji ô mon	Ribe, re'be		
tā'nus	Ribeauvillé, ri bō vil lā		
Regulus, reg'ŷ lus	Ribera, ri ba rā		
Reichardt, riā'rt	Ribes, ri bēz		
Reichenbach, ri'hen bāh	Ricci, rit'che		
Reichenberg, ri'hen berā	Ricciarelli, rit chā rel'lē		
Reichenhall, ri'hen hāl	Richelieu, resh lyé		
Reichstag, riā'stāh	Richter, rêk'tēr		
Reid, rêd	Ricinus, ris'i nus		
Reigate, ri'gāt	Rideau, ri dō		
Reiklavik, rik'yā vik	Riemann, rê'mān		
Reimarus, ri mā'rŷs	Rienzi, ri en zē		
Reindeer, rān'dēr	Riesa, ré zā		
Reinecke Fuchs, ri'nek-ô	Riesengebirge, rê'zen gē bir		
fŷks	gē		
Reinhart, rin'hārt	Rieti, ré ā'tē		
Reinhold, rin'holt	Rigi, Rigli, rê'gē		
Reis, rē's	Rilievo, rê lē a'vō		
Reiske, ris'ké	Rimini, rim'i nē		
Rembrandt, rem'brānt	Rio de Janeiro, rê ô de zhā-		
Remigius, re mij'i us	nā'i rô		
Remiremont, rê mēr mōh	Rioja, rê ô'āh		
Remora, rem'ô ra	Riom, rê ōh		
Remscheid, rem'shit	Ripon, rip'on		
Rémusat, rē-mŷ zā	Rishia, ris'hiz		

Saint Evremond, saht'ävr mōn	San José, sán hò sá'	Saxe, saks	Schönbrunn, shén'brun
Saint-Just, sah zhüst	San Juan, sán Ay án'	Saxe Altenburg, Sachsen-Altenburg, saks - al'tén burg, zák sən al'tén bürh	Schönebeck, shé'né bek
St. Leger, sei'n jér	San Miguel, sán mí gel'	Saxe Coburg Gotha, Sachsen-Koburg Gotha, saks'ko-burg gò tá, zák'sén-kò bürh gò tá	Schönningen, shé'ning en
Saint Louis (Africa) sah lò i	Sanquhar, sang kër	Saxe Meiningen, saks mi ning en	Schoppenhauer, shò'pen hou er
Saint Louis (U.S.) sánt luy' or luy is	Sans Culottes, sah kù-lot	Saxe Weimar, Sachsen Weimar-Eisenach, saks-wi'mür, zák'sén vi mür i'zn áh	Schottische shot'tiah'
Saint-Michel, sah mí shel	San Severino, sán sev e ré'nò	Saxicava, sák sák'a-va	Schubert, shò'bert
Saintonge, sah tōzh	San Severo, sán se va rò	Scafell, ská fel	Schumann, shò'mán
Saint Pierre, sah pi ár	Sans Souci, sán só sé	Scagliola, skál yò'lá	Schuykill, skò'l'kil
Saint Simon, sah sé mōn	Santa Fé, sah ta fá'	Scalliger, skal'i jér	Schwab, shváp
Sakhalá, sák há'rú	Santander, sán tán der'	Stammony, skam o ní	Schwabach, shvák báh
Sakumala, sha kún'ta-lá	Santarem, sah'tá-ren	Scansores, skan só'rez	Schwabenspiegel, shvák ben spē gl
Sál, sál	Santerre, sah tár	Scapula, skap'ú lá	Schwäbisch-Hall, shvák'bish hai
Saluam, sa lum'	Santiago, sán tí á'gò	Schabzieger, sháp tsé gér	Schwanthal, shvân'tá-lér
Salama, sal'a-mis	São Francisco, sá yñ, &c	Schadow, shá'dò	Schwarz, shvára
Saldanha, sál dān'yá	São João, sá yñ pá'y lò	Schaff, sháf	Schwarzburg Rudolstadt, shvára bürh rò dol stát
Salicylic, sal i sil'ik	São Paulo, sá yñ pá'y lò	Schaffhausen, sháf'hau zn	Schwarzburg Sondershausen, shvára bürh zōn dērs hou zn
Salii, sál'i i	Saouari, sá-y á'rē	Schaff, sháf	Schwarzberg, shvára'ten berk
Salina, sa lah	Sapajou, sap'a jó	Schaffhausen, sháf'hau zn	Schwarzewald, shvára'tvált
Salisbury, salz'be ri	Sapphire, safir	Schandau, shán'dou	Schwedt, shvet
Saltee, sal lé	Sappho, saf'ò	Schaumburg Lippe, shoum bürk líp pé	Schwegler, shvák'lér
Salmonidae, sal mon'i dē	Sarajevo, sá rá yá vò	Scheele, shá'lē	Schweidnitz, shvit'nits
Salonica, sa lo ní'ka	Saratoga, sa-ra tó'ga	Scheffer, shef'ér	Schweinfurt, shvin'fúrt
Salutello, sal set	Saratov, sá rá'tòf	Scheidt, skelt	Schwerin, shvā-rén'
Saltillo, sál til'yò	Saravak, sá rá'wák	Schelling, shel'ing	Schwyz, shvēts
Saluzzo, sál lutzò	Sarcina, sár'si na	Schemnitz, shem'nits	Senaca, shák'ká
Salvador, sál vā-dor'	Sardanapalus, sár dan a-pá' lus	Scherer, shá rer	Seicli, shik'lē
Sal Volatile, sal vo lat'i lē	Sardes, sár'des	Scherer, shá rer	Scilly, sil'i
Salwin, sál win'	Sardica, sár di ká	Scherzo, skert'ò	Scio, skio, sí'ò, ské'ò
Salzbrunn, zalts brun	Sardonyx, sárd'ò niks	Scheveningen, shā'ven ing en	Scrabe, skreb
Salzburg, zalts'bürh	Sarpidon, sár pe'don	Schiavone, shvā vō'ná	Scrutin, skru tán
Salzkammergut, zalts'kám er got	Satthe, sárt	Schicht, shiát	Scudéri, sku dá rē
Salzwedel, zalts'vā dl	Sarzana, sár-zá'ná	Schiedam, shé dām	Soutari, sou'ta rē
Samar sa mār	Sarzeau, sar zò	Schist, shiast	Seattle, se at i
Samara (town) sá má rá	Sasine, sa'sin	Schlangenbad, shläng'en bāt	Seale, se ka'lē
Samarang, sam a tang	Saskatchewan, sas kach'e wan	Schlegel, shis gl	Sechi, sek'kē
Samarkand, sam ár kaud'	Sassari, sás'sá rē	Schleicher, shli'hér	Sedaine, sé dan
Sambré, sah br	Sassaram, sas se ram'	Schleiermacher, shli'er müä-ér	Sedan, sé dāt
Samnites, sam'nits	Satalieh, sat a le'th	Schlesien, shlā'zi en	Segni, sen yē
Samothrace, sam o thrās	Satara, sa tá'ra	Schleswig, shles'viá	Segno, sen'yò
Samoyedes, sam o yedz	Saucisse, sa sis'	Schlettstadt, shlet stát	Seguidilla, seg i del yá
Samso, sam'sò	Sauerkraut, zou'ér krout	Schliemann, shle'mán	Seguin, sé gān
Samsoon, sām sōn'	Saumaréz, só'ma rá	Schlosser, shlos'ér	Ségur, sé gür
Sana, sa ná'	Saurin, só mur	Schlözer, shlé'tsér	Selgnorae, sēn'yoi áj
Sanchuniaton, san kó'ni a thon	Saurui, sá ro'rē	Schmalkalden, shmal'käl den	Selne, sen or sán
San Cristobal, san kris to' bal	Saussure, so sür	Schmitz, shmits	Seine et-Marne, sen e mürn
Sandarach, san'da rak	Savary, sá va rē	Schneeberg, shna'berh	Seine et Oise, sen e wüz
Sandbach, sand'bach	Save, shé'vā	Schneekoppe, shna'kop-pé	Seine Inférieure, sen ah fa ri ér
Sandiver, san'di ver	Saverne, sá vern	Schöffler, shé'f'ér	Seismology, sis mol'o jī
Sandys, san dis or sandz	Savigliano, sá vël yá'nò	Schomburgk, shom'bürk	Selachii, se la'ki i
Sangerhausen, zäng'ér hou zn	Savigne, sav'il		Selangur, se lan gor'
San Giovanni, sán jó vān'nē	Savona, sá vō'ná		Selene, se lē'nē
Sangir, sán'ger	Savonarola, sá von á ro'lá		
Sanhedrin, san hed'in			
San Joaquin, sán hò a kēn'			

THE NEW POPULAR ENCYCLOPEDIA

A DICTIONARY OF GENERAL KNOWLEDGE

RÂNDER, a town of India, in Surat district, Bombay, 3 miles n w Surat, with the Tapti between Pop (1891), 10,926

RANDERS, a town of Denmark, in Jutland, on the left bank of the Gudenå, about 6 miles above its mouth in the Randers Fjord. It contains a church dating from the fourteenth century, but much altered since, a town house, court-house, hospital, and a classical school, and has manufactures of hosiery, cloth, and gloves, for which it has long been famous, railway-carriage works, calico printing works, brewing, and distilling. It dates from the eleventh century. The Randers Fjord is navigable by vessels drawing 13 feet of water, and the town is a place of some trade. Pop in 1890, 16,617, in 1900, 20,057.

RANGE, in gunnery, the horizontal distance through which a projectile is propelled by a gun. In general the range depends on the initial velocity, the form and density of the projectile, the angle of elevation of the gun, and the difference of level between the planes upon which the gun and object aimed at respectively stand. The range of ordnance has been greatly extended in recent years, owing to the improvements in construction and increase of size, and projectiles can now be thrown a distance of 12 miles or more. See GUN, GUNNERY.

RANGOON, the chief town of Lower Burmah, and principal seaport of the province, is situated on the left bank of the Hlaing or Rangoon river, where it receives the Pegu and the Poo zwon doun, about 21 miles from the sea, the river entering the Gulf of Martaban by a mouth 3 miles wide, and being navigable for large vessels up to Rangoon. The town stands on a sort of promontory, having the Hlaing on the west and south, and the Poo zwon doun on the east, and covers a large area, as many of the streets are broad and planted with trees on each side, and in some quarters the houses are surrounded by fields or gardens. On the north of the town is the military parade ground and cantonments and within the limits of the latter, but beyond the houses and barracks, stands the celebrated Shwe Dagon pagoda on a terraced hill now fortified. In this quarter are also the Great and the Little Royal Lake, the former situated in Dalhouse Park. The town is almost entirely modern, and built since it came into British possession in 1852. Among the buildings and institutions are the Anglican and Roman Catholic cathedrals, and other churches, the various government buildings, the town hall, the law-courts, custom-house, telegraph-office, jail, lunatic asylum, hospital, high school, St John's College (under missionary management), diocesan school, Phayre museum, &c. Of the pagodas, the Shwe Dagon already mentioned is the chief, ranking as 'the most venerated object of worship in all the Indo-

Chinese countries'. The mound on which it stands is 166 feet high, the structure itself, which is of solid brick and profusely gilt, rising to the height of 321 feet from an octagonal base, and gradually tapering upwards to the tee or gilt iron umbrella ornament on the summit. This last was presented by the King of Burmah in 1871, and was valued at £82,000. The chief industrial establishments are rice husking mills and saw mills. The city is under municipal government, and many improvements have been carried out by the municipality. The streets are properly lighted, and many of them traversed by tramway lines, a good water supply has also been provided. A large and rapidly increasing commerce is carried on with British, Indian, and Chinese ports, and by means of a fleet of river steamers and flats an extensive trade is conducted with inland towns as far as Mandalay and beyond it, there being a waterway between the Rangoon river and the Irrawaddy. There is also communication by railway with Mandalay and Prome. Rice and timber are the staple exports, but raw cotton, catch, precious stones, cheroots, hides, horns, stick lac, ivory, and a variety of other articles are also exported to a considerable extent. Cottons, woollens, coals, machinery, gunnicks, silk, salt, sugar, &c. are imported. The annual exports and imports amount to over £10,000,000. Rangoon dates from an early period, but it was refounded in 1763 by Alompra, and suffered much in the wars between the Burmese and Peguans. It was taken by the British in 1825, and restored to the Burmese in 1827, in whose possession it remained till it was retaken in 1852, when it was permanently annexed to British India. Pop in 1891, 181,210, in 1901, 232,326.

RANIGANJ, a town of India, in Bardwán district of Bengal, on the north bank of the Damodar river, 120 miles n w of Calcutta. It is notable chiefly for its bituminous coal, the seams of which are of great thickness. Pop 14,000.

RANK, the relative position in the army or navy which officers and men hold in respect to each other (See OFFICERS, RELATIVE RANK, &c.) A rank is also a row of soldiers placed side by side, while a file is a number drawn up in line behind each other. The 'rank and file' constitute the body of the army, and include corporals, bombardiers, and privates.

RANKE, LEOPOLD VON, German historian, born in 1795, died 1886. He studied at Leipzig and Berlin, became a teacher in the gymnasium of Frankfurt on the Oder in 1818, and professor of history at the University of Berlin in 1825. His first published work (1824) was a History of the Romance and Teutonic Nations from 1494 to 1535. This was followed by Princes and Peoples of Southern Europe in the 16th and 17th Centuries (1827), The Servian

Revolution (1829), History of the Popes (1834-37), History of Germany in the time of the Reformation (1839-47), History of Prussia during the 17th and 18th centuries (1847-48), History of France, chiefly in the 16th and 17th centuries (1852-55), History of England in the 17th century (1859-68), besides a number of smaller works supplementary of his *History of Germany*. At the age of eighty he undertook with undiminished vigour to write a *World-history*, and a volume of this great work appeared every year until his death. His writings are chiefly valuable for the new material which he discovered in state papers, and the truth with which he presented history unbiassed by personal predilections. Many of his works have been translated into English.

RANKINE, WILLIAM JOHN MACQUORN, civil engineer, born at Edinburgh in 1820, died 1872. He received his instruction in natural philosophy from Professor Forbes, his practical training as an engineer from Sir J. Macneil, and he became himself professor of engineering at Glasgow University in 1855. His numerous contributions to the technical journals have been reprinted (London, 1881), and he was the author of text books on *Civil Engineering, The Steam Engine, Applied Mechanics, Shipbuilding, &c.* He was especially successful in investigating mathematically the principles of mechanical and civil engineering. He was also a song writer.

RANNOCH, LOCH, a lake in Perthshire, Scotland, 35 miles N.W. of Perth, about $9\frac{1}{2}$ miles long, and about 1 mile average breadth. It is surrounded by lofty mountains covered by forests, contains two islands, and has an outlet for its waters in the Tummel, a tributary of the Tay. The margin is studded with farm houses and mansions. Westward from the loch extends the Moor of Rannoch, one of the largest as well as dreariest moors in Scotland. The West Highland Railway from Helensburgh to Fort William crosses the Moor.

RANSOM (from Latin, *redemptio*), the sum required to be paid to the captors of a prisoner of war in order to procure his release. The practice of redeeming prisoners of war by a ransom was a very common one not only in ancient times, but in modern times up to the end of the 18th century. As late as 1780 a treaty was concluded between France and Great Britain on the subject of exchange of prisoners, in which the various relations the different ranks bore to each other were specified, together with the sums required to be paid by way of ransom. A French vice-admiral or an English admiral was estimated as of equivalent value in the exchange of prisoners to sixty sailors or private soldiers, as was also a French marshal or an English field-marshal. The sum payable for a private soldier was fixed at £1 sterling or 25 francs, and the sums payable by the others were proportionable to their ranks. But at the period of the French revolution France intimated her determination to cease paying any ransom, and after that the exchange of prisoners was effected solely on the ground of equality of rank. Ransom is now exacted only by brigands. Prisoners are generally retained until peace is restored, when they are released without ransom, or they may be exchanged during the progress of hostilities. Officers are frequently released during the war on pledging their word of honour to take no further active share in it.

RANTERS, a name sometimes given to the religious body calling themselves Primitive Methodists. See **METHODISTS**.

RANUNCULACEÆ, or **CROWFOOTS**, a natural order of herbaceous, and sometimes, though rarely, shrubby exogens, with alternate or opposite leaves, generally much divided, and with a sheath half clasping the stems, flowers usually conspicuous, even

the apetalous plants having large and gaily coloured sepals, hypogynous stamens, very rarely definite, numerous distinct carpels, simple styles, and fruit either berried with one or more seeds, or follicular, with one or two valves, or in the form of dry achenia. Europe has the largest share in plants of this order, having more than one fifth of the whole, North America has one-seventh, South America one seven-teenth, and India one-twenty fifth. Australia is known to possess eighteen species, Africa has only a very few, growing on the shores of the Mediterranean. Their presence indicates a cold damp climate. Within the tropics they are almost unknown in the low lands, and are found only on the sides or summits of lofty mountains. They are almost all acrid, caustic, and poisonous. Several of them, particularly the hellebores, are drastic purgatives, others, as the hepatics, simple astringents, others so violent in their action as, on application to the skin, to raise blisters, which are apt to pass into ulcers. The potency of their properties makes great caution necessary in their employment for medical purposes, but at the same time seems to indicate that under proper management they might prove very efficacious. They had much more reputation, however, in ancient than in modern times, and with a very few exceptions have almost ceased to be used. The anemone, lark spur, peony, columbine, and other well known flowers belong to his order. See next article.

RANUNCULUS, a genus of plants of the natural order Ranunculaceæ, containing numerous species. The calyx consists of five (rarely three) sepals, the petals are usually five, with a nectary or pore at the base. The name is derived from *rana*, a frog, the plants being common in the places where frogs abound. Most of the species are acrid and caustic. *R. flammula* and *R. accleratus* are sometimes employed to produce blisters. The British species amount to twenty. *R. Asiaticus*, the common garden ranunculus, is a native of the Levant and North Africa, and was first brought to Europe by the Crusaders. It is now a favourite ornamental plant, which has produced innumerable varieties, and of all shades of colour excepting blue. The flowers are double and semi-double, and about 2 inches in diameter. The most common native species, abounding everywhere in pastures, is known by the name of butter-cup. The perennial species *R. bulbosus* and *R. acris* are called crowfoots. See **RANUNCULACEÆ**.

RANZ DES VACHES (in German, *Kuhreihen*) is the name of the celebrated national air which the herdsmen of the Alps in Switzerland sing or play on an instrument called the *Alpenhorn*, or horn of the Alps, when they drive out the herds. It consists of a few simple intervals, yet capable of producing a very striking effect in the echoes of the mountains. This effect becoming intimately associated with the locality of Switzerland, explains the many anecdotes of the home sickness caused by the sound of the Ranz des Vaches when heard by the Swiss in foreign countries. There are, however, variations in the melody, and we find, even in Rousseau's *Dictionnaire de Musique*, several Ranz des Vaches. A collection of the various Ranz des Vaches and other Swiss airs was published in 1818 under the title of *Sammlung von Schweizer Kuhreihen und Volksliedern* (Berne). They are also incorporated in the *Allgemeines Schweizer Liederbuch* (1851).

RAOUL ROCHETTE See **ROCHETTE (DESIRÉ) RAOUL**.

RAPALLO, a maritime town of Italy, in the province of Genoa, district of Chiavari, 18 miles E.S.E. of Genoa, at the north western extremity of the gulf. It has two squares of limited extent, a court of justice, an ancient collegiate church, a superior

Latin school, a hospital, an old castle, now used as a prison, &c. Owing to its fine climate and beautiful situation it is becoming a favourite winter resort. Pop 11,000.

RAPE, in law, the carnal knowledge of a woman obtained by force or against her will. A boy under fourteen years of age is considered in law incapable of committing this offence, and in such a case no evidence is admitted to prove that it was even possible for him to do so. 'A charge of rape', says Sir Matthew Hale, 'is an accusation easy to be made and harder to be defended by the party accused, though innocent.' The testimony of the party ravished is sufficient to condemn the ravisher, along with strengthening points of evidence. Sometimes the testimony of a medical man is required to elucidate various difficulties connected with the accusation. The value of the injured party's testimony is greatly affected by her general character if that has been good, and if she has at once made known the offence and made search for the offender, and if the accused party fled—these are corroborative circumstances which give greater probability to her testimony. Marks of external injury are likewise to be considered as corroborating, but not as certain proofs of the commission of a rape. On the other hand, if she concealed the injury after she had an opportunity of disclosing it, if the place where the act is alleged to have been committed is where it is possible she might have been heard, and made no outcry—these carry a strong though not conclusive presumption that her testimony is false and feigned. The crime is the same whatever be the age or condition of the injured party. By 24 and 25 Vict. cap. c. unlawfully and carnally knowing any girl under the age of ten years, with or without her consent, was regarded as rape, and punishable as such, if the girl were between the ages of ten and twelve the punishment was penal servitude for five years, or imprisonment not exceeding two years, with or without hard labour. But by the Criminal Law Amendment Act of 1885 the maximum penalty of penal servitude for life has been extended to the defilement of girls under thirteen, and the maximum penalty of two years' imprisonment with hard labour has been extended to the defilement of girls between thirteen and sixteen years. In the case of older females, consent must be with held or there is no rape. The punishment for rape is penal servitude for life or not less than five years, or imprisonment for a period not exceeding two years, with or without hard labour. All who aid are equally guilty with the principal party. In Scotland rape was formerly punished by death, and it continued to be a capital offence, though it had long been usual to restrict the pains of law, till the passing of the Criminal Procedure Act of 1887. The usual sentence is penal servitude for life or for a long period.

RAPE (*Brassica napus*), a cruciferous plant, with small yellow flowers, belonging to the same genus as the cabbage and turnip, and cultivated in many parts of Europe. There are two varieties, winter rape and summer rape, the former being sown in August or September, and the latter from March to June. The harvest of the latter commences in the month of August, when the pods are yellow, but before perfect maturity, and as the seed is easily shed it is customary in some places to thrash the plants in the field upon a large cloth. Rape is readily eaten by sheep. Oil is obtained from the seeds by pressure, and is used in large quantities for various economical purposes—for making the soap called *green soap*, for burning in lamps, for oiling machinery, also in medicine, &c. It is apt to become rancid, though there are means of purifying it. Rape cake, made

from the husks and solid part of the seeds after the oil has been expressed, is used as a food for cattle, but it is inferior to linseed cake and some other kinds of oil cake. It is also a valuable manure. A mixture of rape and millet seed is frequently employed as food for cage birds. This plant grows wild in many parts of Europe. The radical leaves are lyrate, and the superior ones very smooth, and embracing the stem. Rape seed oil is rather lighter than water, having a density of 0.913, its colour is yellow, at a few degrees below 0° C it solidifies.

RAPHAEL (or **RAFFAELLO**), **SANIO** or **SANTI**, one of the greatest of all painters, was born at Urbino on Mar 28 or April 6, 1483. His father, Giovanni Sanzio, was a painter of some merit, and from him doubtless the young Raphael received his first instruction in the elements of his art. In 1494 his father died, and he was intrusted to the care of an uncle. His studies, however, received no interruption, and about 1499 he was received into the studio of Perugino at Perugia as one of his pupils, and continued with that celebrated painter for four or five years. Raphael soon surpassed his numerous competitors, and in a short time so completely acquired his teacher's manner that it is difficult to distinguish the works of the two belonging to this period. This is shown by Raphael's early works—The Saviour on the Cross, now in London, The Crowning of the Virgin, in the Vatican, and The Marriage of the Virgin, done in 1504, and now in Milan. About this time the painting of the library of the cathedral at Siena was intrusted to Pinturicchio, who had influenced Raphael at Perugia, and now invited him to assist in this labour. Raphael complied, and executed a number of designs for the work, some of which still exist. To this period probably belongs his Vision of a Knight, now in the London National Gallery. In 1504 he visited his native town, and while there painted Christ Praying on the Mount of Olives, a St. Michael, and a St. George, the two last of which are now in the Louvre. Towards the end of the same year he proceeded to Florence, attracted thither by the fame of Michael Angelo and Leonardo da Vinci, who were at that time engaged upon an important work there. The labours of these artists, and Florence itself, then the seat of all that was beautiful, made a deep impression on his youthful sensibilities, and he derived great advantage from the acquaintance of many young artists of distinction—Ghirlandajo, San Gallo, and others—as well as from the study of Masaccio and others of the earlier masters. In the following year we find him again at Perugia, and while there he sustained his reputation by several paintings—a Madonna for the church of the Frati de' Servi, a Mater Dolorosa, over which he delineated, in a second picture, God the Father (now in the Colonna Palace at Rome), with some other easel pieces, and a Christ, with God the Father, surrounded by several saints, for the small Camaldulan convent, which was his first painting in fresco. To the years 1505–06 belong the *Assisi Madonna*, bought for the National Gallery in 1885 for £70,000. All these works partake somewhat of the style of his master, and do not exhibit the grandeur, dignity, and power of his later performances, but are distinguished for the sensibility and feeling belonging to the earlier school. His desire for further improvement drew him a second time to Florence, where he zealously pursued his study of the older masters, and where his acquaintance with Fra Bartolommeo gave him a more correct knowledge of colouring. He seems to have spent the whole time of his residence in that city in his studies, at least it is known that he executed there nothing but a few portraits and the cartoon for his

Entombing of Christ This picture itself he painted in Perugia, whence it was afterwards transferred to the Borghese Palace at Rome. It is a miracle of composition, design, and expression, and was surpassed in these respects by few of his subsequent performances. After finishing it Raphael returned for the third time to Florence, where his studies became again his chief employment, at least we are able to point out, with certainty, as having been executed at this time, only the excellent Madonna called *La Bella Giardiniera* (now in the Louvre), and another Madonna, with the Fathers of the Church (now in Brussels), neither of which was entirely finished by Raphael. His repeated residence in Florence had the greatest influence not only on himself but on the whole of the modern school of art. He found that Cimabue, Giotto, Fiesole, and the Florentine artists of the time could not only compete with his teacher, Perugino, in all the departments of art, but that some of them—Masaccio, Fra Filippo Lippi, Mariotto Albertinelli, Ghirlandaio, and Fra Bartolommeo—surpassed him in excellence of composition, correctness of design, and liveliness of colouring. In the works of Ghirlandaio, and, above all, of Masaccio, he found, what he most desired, a grander style in forms, drapery, and outline. As Raphael had already acquired the excellences of the greatest masters of his time in Romagna he now possessed himself of those of the Florentine school, for which he ever entertained a great esteem. A striking proof of this was his copying, in his decoration of the *loggia*, without the least alteration, two figures by Masaccio, which may still be seen in the Carmelite monastery at Florence, namely, Adam and Eve Driven from Paradise by the Angel. Pope Julius II had employed Bramante in rebuilding St Peter's and in the embellishment of the Vatican. At Bramante's suggestion Raphael was in 1508 invited to Rome. The pope received him with distinguished favour, and the artists of Rome with the greatest respect. Here he executed the *Disputa*, or *Dispute of the Fathers of the Church*, on the wall of the second chamber, called the *stanza della Segnatura*, next to the great hall of Constantine. Between this painting and his *Entombing of Christ* there is a similarity, which is not the case with his later performances. In the grouping also he has adhered to the style of his earlier predecessors, but the *Disputa* is by far the more perfect of the two. All is life, motion, action, the variety of the characters is admirable, every stroke is full of meaning. If we divide Raphael's works into several periods, the first comprising his earlier performances, executed in the manner of Perugino, the second comprising those which he executed in Urbino, Florence, &c., we recognize in the *Disputa* the transition to the third manner, which is still more clearly manifested in the *School of Athens*, the second grand painting in this chamber. This painting (which was probably preceded by the *Parnassus*, the third great painting of the room) displays far more freedom of handling and more manliness and energy. By it Raphael gained so completely the favour of the pope that he caused almost all the frescoes of other artists in the Vatican to be effaced that the rooms might be adorned by him. Raphael painted in their stead, in the above-mentioned *stanza*, the allegorical figures of Theology, Philosophy, Justice, and Poetry, in the corners of the ceiling, the Fall of Adam, Astronomy, Apollo and Maryas, and Solomon's Judgment, all having reference to the four principal figures of the apartment, and, lastly, on the fourth wall, over the windows, Prudence, Temperance, and Fortitude, below them the Emperor Justinian Delivering the Roman Law to Tribonian and Gregory X Giving the Decretals to an Advocate, and under them Moses and an armed allegorical figure. In 1511 all the pieces of

the first *stanza* or hall were finished. According to Vasari's account he now executed several less important but excellent frescoes—Isaiah, in St. Augustine's, the Prophets and Sibyls, in Sta-Maria della Pace, and the celebrated Madonna di Foligno, in the Vatican. The progress which Raphael made in his peculiar style is shown by his next painting in the *stanza d'Elodoro*, the Expulsion of Heliodorus from the Temple. Here the style is far more earnest, grand, bold, and energetic, the execution far more spirited and masterly. This was followed in 1514, after the accession of the new pope, Leo X., by his *Leo the Great Stopping the Progress of Attila*, the Deliverance of Peter from Prison, and, on the ceiling of this *stanza*, Moses Viewing the Burning Bush, the Building of the Ark, the Sacrifice of Isaac, and Jacob's Dream. Nearly contemporary with them are the following easel-pieces the famous Madonna del Pece (in the Escorial), which was transferred in Paris from wood to canvas, his equally beautiful Cecilia, which is said to have been finished by Giulio Romano, a Holy Family, called *La Perla* (in the Escorial), Ezekiel's Dream, among several Madonnas that called *Dell' Impannato*, Christ Bearing the Cross, known by the name of *Lo Spasmo di Sicilia* (now in Madrid), Christ in Glory, Surrounded by Saints (*I cinque Santi*), his own portrait (now in Munich), the portrait of Leo X (now in Paris), &c. Albert Durer, induced by Raphael's reputation, is said to have made him an offer of his friendship and to have sent him several of his own etchings, with his portrait, and to have received in return a number of drawings by Raphael's hand. With the Conflagration of the Borgo (*Incendio del Borgo*) Extinguished by the Prayers of Leo Raphael began the third *stanza* of the Vatican. This work is a master piece for strength and truth of expression, beauty of forms, excellence of grouping, and variety. It was followed by the Coronation of Charlemagne, Leo III's Vindication of Himself before Charlemagne, and the Victory of Leo IV over the Saracens at Ostia (on which, however, Raphael's scholars were employed in working from his designs). He next completed the galleries (*loggia*) of the Vatican palace, by which the rooms communicate, and which had been left unfinished by Bramante, and furnished designs for the paintings and stucco-work with which they were to be adorned. The execution of the paintings (excepting four done by himself) Raphael trusted to Giulio Romano and some of his other pupils, and the stucco-work to John of Udine. In this way was formed a complete series of works of art, which have exalted the palace of the Vatican into a temple of the arts. The pope, charmed with the excellence of these performances, committed to Raphael the decoration of another *stanza* of the Vatican with images of the saints and apostles, appointed him superintendent of all the embellishments of this palace, and loaded him with marks of honour. During this time Raphael produced many other excellent pieces, prepared designs for several palaces in Rome and other cities of Italy, and finished the Madonna for the church of St Sixtus in Piacenza (now in Dresden), unquestionably one of the master-works of his pencil. The loftiness, dignity, and sublimity, combined with sweetness, grace, and beauty, which reign in this picture, render it imitable. Other works of this period are St Michael, the portraits of Beatrice of Ferrara, of his beloved Fornarina, of Carondelet (now in England), of Count Castiglione, and of the beautiful Joanna of Arragon. The authenticity of the last has been disputed. To this time also belong the frescoes in the Farnesina, representing the life of Psyche in twelve pictures, and Galatea—all, except the last, executed by his scholars, also the designs from the fable of Psyche, altogether different

from the former, thirty eight in number, and the *Ma donna della Seggiola* (now in Paris) It was probably at a later period that Raphael prepared for Agostino Chigi designs for the building and decoration of a chapel in *Sta Maria del Popolo* and for Leo X. the celebrated cartoons (see *CARTOON*) for the tapestry of one of the chambers of the Vatican. Seven of these cartoons are now in the South Kensington Museum. The whole series of tapestries, which were brought to Rome in 1519, where they excited the highest admiration, are hung up in the palace of the Vatican. They have been preferred by many to the *stanze* of Raphael in point of composition, loftiness of character, variety of expression, grouping, attitudes, &c. For painting the fourth *stanza*—the hall of Constantine—in oil Raphael left only a few sketches, especially of the battle between Constantine and Maxentius, which were used by Giulio Romano and his other scholars, to whom the labour was eventually intrusted. The pictures, however, of Justice and Benignity in this hall were probably executed by his own hand. Several easel pieces also seem to have been executed by him about this period, among others *John in the Desert* (of which there exist several copies, namely, in Florence, in London, in Paris, in Vienna, and in Darmstadt the copies are so good and so much alike that the original cannot be distinguished, and is not known), his *Madonna and Child*, on whom an angel is strewing flowers, and a *St Margaret*. Raphael's last and unfinished painting—the *Transfiguration of Christ*—is in the Vatican. Although critics have objected to this painting that it contains two subjects and consists of two pictures, every one must concede that it is the most perfect master piece which modern art has produced. The composition is so noble, the design so perfect, the expression so elevated and sublime, the characters so various, the colouring (as far as it proceeds from Raphael) so true and vigorous, that it surpasses all his other works in these points. The head of Christ, in which this combination is most admired, is said to have been his last labour. Attacked by a violent fever, which was increased by improper treatment, this great artist died April 6th, 1520, his birthday, at the age of thirty-seven years. His body was laid out in state in his study, before his *Transfiguration*, and consigned with great pomp to the church of *Sta-Maria Rotonda* (formerly the Pantheon), where his bones still rest, with the exception of his skull, which was afterwards placed in the Academy of St Luke. His tomb is indicated by his bust, executed by Naldini, and placed there by Carlo Maratti, and by the epitaph of Cardinal Bembo—

'Ille hic est Raphael, timuit quo sospite vinci
 'magis rerum parens, et moriente mori.'

All contemporary authors describe Raphael as kind, obliging, modest, and amiable, equally respected and beloved by high and low. The beauty of his figure, and his noble countenance, which inspired confidence, prepossessed the beholder in his favour at first sight. He died unmarried, though by no means averse to women. In accordance with his last will, all his designs, sketches, and other objects of art, went to his favourite scholars, Giulio Romano and Francesco Penni il Fattore.

When we consider the number of Raphael's paintings, however severe we may be in judging of their genuineness, it seems hardly credible that the entire compass of a human life could be sufficient for their execution. They prove the wonderful fecundity of his genius, and the facility of his execution. It is, moreover, to be considered that Raphael furnished the designs for a great number of pieces executed by his scholars, devoted much study to his most important paintings (as is shown by the nume-

rous sketches of *Madonnas*, of the *School of Athens*, of the *Dispute of the Fathers*, &c.), and, in many cases, first drew all his figures naked, in order the better to adapt the drapery and its folds to their respective attitudes. And if we further reflect that the supervision of the building of St Peter's church, and the preparation of designs for the erection of other churches and palaces, with several collateral tasks, were imposed on him, we must be struck with the highest admiration of his genius. At first his design, conformably with the taste of the times and the instruction which he had received, was somewhat stiff and dry. After studying with assiduity nature and the old masters, he formed for himself an ideal which, by its harmony with nature, touches the feelings, while the Greek ideal rather overpowers by its loftiness. In his manhood his pencil acquired greater freedom, and his figures became full of life and motion. His drapery, always simple and light, in his latest pieces generally forms large masses, and is excellently arranged so as not to conceal the parts intended to be shown. In foreshortening and in perspective he was imperfect. In colouring he was at first dry, till, taught by Fra Bartolommeo, he consulted nature alone. Although in this department of the art he never reached the excellence of Correggio or Titian, his colours always appearing too heavy and dull, yet his *St John* in Florence, the *Foranina*, and his *Transfiguration*, show how far he had advanced, and only from these pictures can we form a judgment, for his other works, of the best period, were generally executed by his scholars, or at most, retouched by him. The distribution of light and shade Raphael understood very well, but with respect to the *chiaroscuro* he is by no means to be compared with the above mentioned great colourists. On the other hand, composition and expression must almost be considered as Raphael's exclusive property, and in these respects he has never found a rival. He always selected the moment of action which expressed most clearly the dispositions of the actors. Avoiding all unnecessary exertion of strength, all excess, occupied solely with the object to be represented, he endeavoured to give to his persons just so much motion as was requisite. Thence it is that we frequently find in his works straight, simple attitudes, which are, nevertheless, so beautiful in their place, and leave so much room for the expression of feeling. He first meditated on the whole of the scene to be represented, and the general character of the expression, next proceeded to the figures, and lastly to the single parts of them. In this way his figures possess a harmony which many other artists have aimed at in vain. The most distinguished of his scholars were Giulio Pippi Romano, Francesco Penni il Fattore, Polidoro Caldara di Caravaggio, Benvenuto Garofalo, John of Udine, Bartolomeo Ramenghi il Bagnacavallo. These, with their followers and later imitators, constitute the Roman school, founded by Raphael, which has ever been distinguished above others for the excellencies which belonged to its founder. The principal Lives of Raphael are those of Braun, of Fuseli, of Quatremère de Quincy (Paris, 1825), of Wolzogen (Leipzig, 1865, English by F. E. Bunnett, 1886), of Passavant, Rafael von Urbino und sein Vater (Leipzig, 1839 and 1858), of Crowe and Cavalcaselle, Raphael, his Life and Works (two vols., 1882-85), of Muntz, Raphael Sa Vie et son Œuvre (1881, new ed., 1900, Eng. trans.), and of Knackfuss (1899).

RAPIER, a light, highly tempered, edgeless and finely pointed weapon used for thrusting. It is about 3 feet in length, and was long a favourite weapon for duels. Its use now, however, is restricted to occasions of state ceremonial.

RAPIN DE THOYRAS PAUL, a French historian, born at Castres, in Languedoc, in 1661. His father, who was an advocate, designed him for the law, though his own inclination was for a military life. He pursued his studies successfully at the Protestant Academy of Saumur, and was admitted an advocate in 1679. The revocation of the edict of Nantes, however, drove him to Britain in 1686, and subsequently to Holland, where he entered a company of French cadets. In 1689 he followed the Prince of Orange into Britain, and distinguished himself at the battle of the Boyne. He was afterwards employed in the capacity of tutor to the young Duke of Portland, whom he accompanied through Germany, Italy, and France. In 1707 he settled at Wesel, in the Duchy of Cleves, and devoted himself to the composition of his *History of England*. He died at Wesel in 1725. His great work, *L'Histoire d'Angleterre* (Hague, eight vols 4to, 1724), has been twice translated into English. It is prolix and unanimated, but impartial, and contains much solid information. The style is clear, his facts are methodically arranged, and he is always careful to cite his authorities. Voltaire remarks that England was for a long time indebted to Rapin for the only good complete history she possessed, and adds that it was the only history in Europe that could be regarded as approaching the perfection required in such works. It embraces the period from the invasion of the Romans to the accession of William and Mary, but continuations by others were afterwards added.

RAPP, GEORGE, a peasant who figured as a fanatic, and founder of the Harmonites, was born at Wurtemberg in 1770. When a mere youth he thought he was favoured with special revelations, and at last brought himself to believe that he was destined to restore Christianity to its original purity. Afterwards, not satisfied with attempts to reform the church, he endeavoured to introduce his views into municipal arrangements, and being prevented by the state, emigrated to America, where in 1804 he founded at Pittsburg a colony which he called Harmony, because among its members complete harmony, in other words, unity and equality, were to rule. He afterwards sold the colony to Robert Owen, and went off to Indiana, but returned, and in 1811 founded, on the right bank of the Ohio, the colony of Economy, which soon became the principal seat of the Harmonites. It has not made progress, but still continues to exist. Rapp died in 1847.

RAPP, JOHN, COUNT OF, a French general during the revolutionary war, was born at Colmar, in 1773. In 1788 he entered the military service. As aid of General Desaix he accompanied him during the campaigns in Germany and Egypt. After Desaix had fallen at Marengo, Rapp became aid to Bonaparte, to whom he had carried information of Desaix's death. In 1802 he executed the commission which he had received from the first consul to exhort the Swiss to a cessation of hostilities, and to proffer the mediation of France in the conflict of parties, which had destroyed the tranquillity of the country since its occupation by the French armies. The Swiss submitted to Bonaparte's decision. In the following year Rapp was despatched to the mouth of the Elbe to superintend the erection of works to protect the country against the landing of the British. On the breaking out of the war against Austria, in 1805, he accompanied Napoleon, and after the battle of Austerlitz, where he threw the Russian guards into confusion by a bold attack with his cavalry, and took Prince Repnin prisoner, he was made brigadier general. In the war with Prussia and Russia he also fought with reputation, and in the summer of 1807 received the chief command in Dantzg, in the

room of General Lefebvre. For distinguished service done in 1809 he was created a count of the empire, and in 1811 he received the cross of grand officer of the Legion of Honour. With the exception of a short interruption in 1812, when he distinguished himself in Russia, he remained seven years commander of Dantzg, which he defended after the retreat of the French army from Russia, till 1814, during a severe siege, in which he displayed great talent and brilliant courage, and not till all means of defence were exhausted, and he was compelled by famine, did he capitulate. He was taken as a prisoner of war to Kiev. Returning to France in 1814, he was received with distinction by Louis XVIII., and in March, 1815, was intrusted with the command of the first *corps d'armée*, destined to retard the progress of Napoleon. But when the defection of the whole army rendered all resistance impossible, Rapp also went over to Napoleon, who made him commander of the army of the Rhine, which occupied the lines on the Lauter and from Weissenberg, and extended along the Rhine as far as Huningen. After several battles with an enemy of superior force, Rapp retreated under the cannon of Strasburg. When Louis XVIII. returned a second time to Paris Rapp was pardoned, and retained the command of the fifth division, granted him by Napoleon, till September of the same year, when the army was disbanded. He retired to his estates, but soon returned to Paris. Rapp died in 1821, being at the time lieutenant-general of the cavalry. After his death appeared the interesting *Mémoires du Général Rapp, écrits par lui même* (Paris, 1823).

RAPPAHANNOCK, a river of Virginia, which rises in the Blue Ridge, and runs ESE about 130 miles, and flows into Chesapeake Bay, 25 miles south of the mouth of the Potomac. It passes the towns of Falmouth, Fredericksburg, Port-Royal, and Leeds, and is navigable to Fredericksburg, 110 miles, for vessels of 130 or 140 tons. The name of the Rappahannock is associated with some of the most sanguinary struggles of the war of Secession, at Fredericksburg, Chancellorsville, and the Wilderness.

RAPTORES, the name applied to the Birds of Prey, and denoting thus a prominent order of the class of Birds. These birds are distinguished by the sharp-edged strong bill, which is pointed, and frequently provided with a serrated or dentate margin. The upper mandible is longer than and arches over the lower one with its hooked tip. The base of the bill is provided with a membranous *cere* (see *ORNITHOLOGY*), in which the nostrils open. The whole body is exceedingly muscular, the wings being usually long and powerful, and thus adapted for giving these birds the power to pursue and hunt down their prey. The legs are stout and robust. The toes number three in front and one behind, and are provided with strong curved nails or *talons*, whereby the prey may be seized or torn. The tail is broad, and generally composed of twelve feathers, it may be rounded or forked at its extremity. The tarsi are not markedly scutellate, that is, covered by scales, and in some cases the legs may be feathered to the toes. In the Owls the outer of the front toes may be turned backwards at will. The females are generally of larger size than the male Raptore, and these birds are monogamous, the nest being placed generally in high or inaccessible situations, and rarely more than four eggs being produced. The young are heterophagous, that is, helpless and dependent upon their parents when hatched, and are usually naked when born. The Strigidae or Owls form the Nocturnal Raptore, and the Accipitrine (Falcons, Hawks, and Eagles) and Vulturine (Vultures and Condors) constitute the Diurnal Birds of Prey.

RARATONGA, or **RAROTONGA**, an island in the South Pacific Ocean, belonging to the group of Cook's Islands, lat. $21^{\circ} 13' \text{ s.}$, lon. $160^{\circ} 6' 33'' \text{ w.}$ It is about 80 miles in circuit, and consisting of a mass of mountains, becomes visible at a great distance, and has a very romantic appearance. It presents bold cliffs to the sea, and is surrounded by a reef with several small openings, which admit small vessels, but afford no anchorage or shelter. It appears to be of volcanic formation. The inhabitants, about 4000, have been converted to Christianity, and made great progress in civilization. They live chiefly in the three villages of Avarua in the north, Ataia in the south-east, and Arognai in the south-west. These villages are well built, plastered with lime, and whitened, and have a very clean and comfortable appearance. The chief productions are yams, sweet potatoes, figs, pine apples, turkeys, fowls, and ducks. Raratonga has belonged to Britain since 1888.

RARITAN, a river of New Jersey, formed by two branches which unite 20 miles above New Brunswick. It becomes navigable 2 miles above that city at a place called Brunswick Landing. It passes Amboy, and then widens into Raritan Bay, which is immediately connected with the ocean.

RASH, an eruption of the skin. The commonest rashes are those of the specific fevers, the crimson rash of measles, the scarlet rash of scarlet fever, the rose spots of typhoid fever, and so on. But besides these there are numerous eruptions dependent upon disordered states of the body, and apart altogether from any infectious disease, such as nettle rash.

RASHI, properly **RABBI SALOMON-BEN-ISAAK**, sometimes erroneously called **JARCHI**, the most famous of the French rabbins, was born at Troyes about 1040. Being placed in the most favourable circumstances he made astonishing progress in ancient languages, philosophy, medicine, and astronomy. His acuteness in explaining the Holy Scriptures and the Talmud was so remarkable that his contemporaries honoured him with the titles of interpreter of the law and prince of interpreters. To satisfy his longings after knowledge he undertook an extensive tour through Italy, Greece, Palestine, Egypt, Persia, and Germany, where he was particular in visiting the towns which possessed learned Jewish schools. The literary treasures thus collected he introduced into his writings, which were received at the time with the greatest enthusiasm, and are still held in high estimation. His most famous work is a Commentary on the Pentateuch. He also wrote commentaries on the prophets, the Talmud, and various treatises on miscellaneous subjects. He died in 1105, in the sixty-fifth year of his age.

RASK, **RASMUS CHRISTIAN**, the son of poor peasants at Brendekilde, near Odense, on the Danish isle of Funen, born in 1787, has earned a distinguished name among the students of northern tongues and literature. After he had studied at the University of Copenhagen he undertook a journey to Sweden and Russia, to increase his acquaintance with the northern languages, and in 1808, after a considerable stay in Iceland, was appointed an assistant in the academical library of Copenhagen. His fame as a linguist he founded by several works upon language, particularly *An Introduction to the Knowledge of the Icelandic or Old Norse Tongue* (Copenhagen, 1811), and also by an edition of *Biornonis Haldorsen's Icelandic Dictionary* (Stockholm, 1817). Soon after appeared his *Instructions in the Anglo-Saxon tongue*, and his *Researches as to the Origin of the Old Norse or Icelandic*. From 1817-22 he made, at the expense of the government, a second journey to Russia, then to Persia and India. He returned to Copenhagen, and in 1822 was appointed professor of literary his-

tory. Subsequently he was made professor of oriental languages and librarian to the university. During this period he published a series of interesting works, among which may be mentioned a *Spanish Grammar*, *Instruction in the Friesland Tongue*, and *On the Antiquity and Genuineness of the Zendavesta*. Many other northern and modern languages engaged his attention, and he was preparing for still more important labours when he was suddenly and prematurely cut off in 1832. His papers in MS. were purchased by the government.

RASKOLNICIANS. See **ROSKOLNICIANS**.

RASORES, or **GALLINACEI**, the order of Birds represented by such forms as the Fowls, Turkeys, Partridges, Grouse, Pigeons, &c., and so named from their 'scratching' habits. These birds possess a highly arched upper mandible, the nostrils existing at its base, and being covered by a cartilaginous scale. The upper mandible projects beyond the lower one, both at the sides and at the tip. The head is generally of small size, the legs being strong and stoutly built, and feathered either to the joint between the tibia and tarso metatarsal bone (see **ORNITHOLOGY**), or even to the toes. The toes are arranged three in front and one behind, they are stout, short, more or less completely united at their bases by a web, and provided with short powerful nails, well adapted for scratching in the ground in search of food. The hinder toe is shorter than the front digits, and is usually placed at a higher level than the other toes, but in the Pigeons and other perching members of the order the hinder toe exists on the same plane as the other digits. The back of the tarsus may also bear epidermic appendages, especially in the males, in the form of 'spurs,' which constitute weapons in the combats in which these birds engage at the breeding season. The crop and gizzard are well developed, the food consisting mostly of grains and seeds. The nests are built in the ground generally, and are of rough simple construction. These birds are polygamous. The males, which always exhibit the greatest brilliancy of plumage, take no part in incubation, and the young are generally able to forage for themselves on leaving the egg, although the young of the Pigeons present exceptions to this latter rule. The flight is usually weak, and is accompanied by a whirring sound. The Pigeons present so many points of difference from the more typical Rasores, that some ornithologists include them in a special group, that of the Columbæ or Doves.

RASPBERRY, the fruit of *Rubus Idaeus*, natural order Rosaceæ. The stem is woody, nearly erect, and rough with numerous fine prickles; the inferior leaves are pinnate, composed of five or three oval leaflets, green above and whitish and downy beneath, the flowers are white and rather small; they are succeeded by a well known fruit, composed of numerous single-seeded juicy drupes of a delicious flavour. It grows wild in rocky places throughout the colder parts of the northern hemisphere. Several varieties are cultivated, differing in the size and colour of the fruit, either red, flesh coloured, or yellow. A light soil is best suited to the culture of the raspberry. It is generally propagated by suckers, which the old roots give out in profusion, and the time of planting continues from November till the middle of March. A distance of 3 feet in every direction should be left round the stocks, and no more suckers should be suffered to remain than are intended to bear the following year, unless young plants are wanted, and if very large fruit is the object no suckers should be left. On the other hand, when the strongest suckers are wanted, the fruit bearing shoots should be cut down. Raspberries have a grateful subacid taste,

their perfume is delightful. They are much used in cookery and confectionery, as well as in desserts with sugar they are made into jam and jelly, and also into cakes. The juice, mixed with a certain portion of sugar and brandy, constitutes the liquor called *raspberry brandy*, and it is sometimes manufactured into wine. In some parts of Europe a white vinegar is prepared by infusion, which is converted into a syrup by adding the requisite quantity of sugar. The flowering raspberry (*R. odoratus*) is a highly ornamental shrub, distinguished by its very large bright-red flowers, and is frequently cultivated in gardens, both in Europe and America. The genus *Rubus* comprehends the brambles, blackberries, and cloudberrries.

RASPBERRY VINEGAR, a refreshing summer beverage and cooling drink for invalids, is composed of raspberry juice, vinegar, and sugar. We submit one or two recipes for its manufacture.—1 Bruised ripe raspberries and white wine vinegar, of each 3 pints, macerate for three days, press, strain, and to each pint add 1 lb of white sugar. Boil, skim, cool, and at once bottle. Some makers add about 2 fluid oz of brandy to each pint. 2 Fresh raspberries, 3 lbs., good vinegar, 2 lbs., macerate in glass for a fortnight, and then strain without pressure. 3 Into a jar filled with the fruit pour as much vinegar as the vessel will hold, in eight or nine days pour off the vinegar and allow the fruit to drain for some hours. The mixture of juice and vinegar thus obtained is added to a similar quantity of fruit, and the same process gone through a second, and by some a third time. The liquid is then boiled gently for about five minutes, with its own weight of white sugar. Before drinking, it will require to be more or less diluted with water, according to taste.

RASTADT, or **RASTATT**, a town of Germany, in the Grand duchy of Baden, on the river Murg, about 4 miles from the Rhine (between it and the Black Forest), and 14 s w of Karlsruhe. It was formerly a fortress of the first rank, but in 1892 the fortifications were dismantled. Its chief building is the former palace of the Margraves of Baden-Baden, now used for military purposes. Lace, tobacco, and cigars are made. Pop in 1895, 13,268. Rastadt is memorable for two congresses. At the congress of 1713, Prince Eugene for Austria, and Marshal Villars for France, began the negotiations which put an end to the Bavarian war of Succession by the Peace of Rastadt, March 6, 1714. The second congress at Rastadt was opened Dec 9, 1797, for the purpose of concluding peace between France and Germany, and was dissolved by the Emperor of Germany, April 7, 1799. The French ministers Roberjot, Bonnier, and Jean Debry set out to return, April 28, 1799, but about 200 paces from the suburb were attacked by a troop of hussars. Roberjot and Bonnier were killed, their papers taken, and their persons plundered, Jean Debry and the secretary Rosensiel escaped to Rastadt. The Diet at Ratisbon ordered an inquiry into the affair, which it left to the emperor. This, after being prosecuted for some time with spirit, was at length dropped. It is now generally believed that though the hussars had orders to take the papers from these ministers, the killing was probably caused by their wish to plunder.

RAT, a genus of Rodent Mammalia, forming a typical example of the family Muridae. In this genus the lower incisors are narrow, pointed, and smooth. Complete clavicles or collar-bones exist, and the front limbs possess four toes and a rudimentary thumb, the hind legs possessing five toes. The tail is long, pointed, and scaly, or in any case but thinly haired. Two incisors, two premolars, and four molar teeth exist in each jaw.

Of the Rats probably the best known and most familiar species is the Norway or Brown Rat (*Mus decumanus*), which has nearly extirpated by its increase the true English or Black Rat (*Mus rattus*). The Brown Rat is larger in size than the latter species, and is known by its brownish fur. It has spread itself over the entire globe, being conveyed by ships to the most distant quarters, and by its prolific increase and destructive habits, committing vast ravages and great damage to property and provisions. In Jamaica the Brown Rat was introduced to aid in driving away the plantation rats, which destroyed the crops. This end was undoubtedly attained, but the brown species in its turn and by its increase, soon became a more dangerous foe than the extirpated form. These animals are very voracious. The males greatly outnumber the females, a fact which providentially tends to limit their increase in some degree. Varieties of this species appear to exist, there being visible distinctions and differences between the Sewer and Barn Rats. These animals exhibit not only a high degree of cunning and audacity, but under certain circumstances may evince a great development of instinct. They are devotedly attached to their young, and begin to breed at four months of age. From three to four broods may be annually produced, and from eight to fourteen young may exist in each brood. The Brown Rat swims with great facility, and dives with vigour, remaining under water for a considerable time, and swimming thus to some distance. The cunning of these rats is not less than their impudence, it is almost impossible to take them in a trap after one or two have been thus caught, as the rest avoid it with scrupulous care, however tempting may be the bait it contains. The surest way to remove them is by poison, which, however, they frequently detect and avoid.

The Black Rat possesses a blackish gray fur. The upper jaw projects further beyond the lower jaw than in the Brown Rat, and the upper fur exhibits a number of long hairs or bristles, which project beyond the softer under fur. The ears and tail are relatively longer in the Black Rat than in the other species. The Black Rat exists chiefly in warm and tropical climates, and although the notion generally received is that already stated, that the black species has been exterminated by the increase of the Brown Rats, some observers seem to think that the scarcity of the former has arisen from the stronger males of the brown species mating with the black females, and thus producing a brown progeny. In France the two species live together in harmony.

The fur of the black and brown black varieties is used by furriers for making hats, and in the manufacture of a delicate leather much employed in making gloves. White or albino rats are sometimes found, the offspring of white and black parents being pied in colour. Several foreign species or varieties of rats attain a large size, the *Mus giganteus* of India sometimes attaining a length of 2 feet and upwards. The lower castes of Hindus and the Chinese eat rats. The Water Rat or Water Vole is described in the article **VOLE** (which see).

The term rat is also applied to other genera and species of Rodent animals than those belonging to the family Muridae. The Mole Rats or Rat Moles, forming the family *Aspalacidae*, and represented by the Common Mole Rat or Slepaz (*Spalax typhlus*) of Southern Russia, Asia Minor, and Syria, are examples of such forms. The incisors are very large and projecting, the outer ears very small, whilst the eyes are concealed by the skin. The tail is rudimentary. This form lives in burrows, which it excavates by means of its powerful claws. The Coast Rat or Sand Mole (*Bathyergus maritimus*), included

in the above family, of the Cape of Good Hope and South African coasts, has the incisor teeth extremely prominent and projecting, no outer ears exist, the claws of the fore-feet particularly are large and powerful. Like the preceding, this animal burrows underground. The Fur Country Pouched Rat (*Saocophorus borealis*) of Canada possesses enormous cheek pouches. It averages nearly 10 inches in length, the tail measuring about 2 inches. These rats are gregarious in habits, living in burrows, and feeding chiefly on roots, seeds, and nuts. The Canada Pouched Rat is a distinct species from the preceding, and is distinguished by the slightly grooved incisor teeth, those of the Fur Country Pouched Rat being deeply grooved. The cheek-pouches, which serve as food receptacles, are about 3 inches in depth, and extend from the sides of the mouth to the shoulders. These rats are very destructive to young trees and plantations (See the illustration at art RODENTIA). The Bay Bamboo Rat (*Rhizomys badius*) found in Nepaul, China, and Malacca, is so named from its habit of feeding on the bamboo roots. It averages a small rabbit in size. The Beaver Rat (*Hydromys chrysogaster*), inhabiting Tasmania, swims and dives well, and attains an average length of 2 feet, with a tail of the same measurement. The hind feet are webbed, so as to adapt it for its aquatic life. The Kangaroo Rat is described under that head, this animal being a Marsupial Mammal, and allied to the Kangaroos themselves. The Musk Rat or Musquash is also described in the article of that name (which see), but a few words may be devoted to noticing a Rodent form known as the Coypu Rat or Racoonda (*Myopotamus Coypu*) of South America, a species included in the Castoridae or Beaver family. This animal inhabits the banks of Chilian rivers, burrowing in the banks, and swimming freely, although it is of awkward gait on land. The fur is reddish brown in colour, and in general appearance the creature is not unlike a miniature beaver. The average length is about 2½ feet, the tail being about 15 inches long and being rounded. These animals are hunted for the sake of their fur, which is imported in large quantities into Europe.

RATAFIA. See LIQUEUR.

RATAN. See RATTAN CANES.

RATCHET, in machinery, a bar or piece of mechanism, turning at one end upon a pivot while the other falls into the teeth of a wheel, allowing the latter to move in one direction only. The teeth of this ratchet wheel are angular, and on its forward motion the ratchet slips easily over the inclined plane of each tooth, and falls down behind the perpendicular base, and so prevents the backward motion of the wheel.

RATEL, or HONEY BADGER (*Mellivora*), a genus of animals belonging to the badger family (*Melidae*), and included in the carnivorous order of Mammalia. These animals are so named from their partiality for honey as a diet. They are found chiefly in South and East Africa, but an allied species occurs in India, and is known by the name of Indian Ratel or 'Beejoo'. The Cape or South African Ratel (*Mellivora Ratel*) averages about 3 feet in length, including the tail, which measures 8 or 9 inches in length. Like other badgers it is plantigrade in its locomotion, that is, applies the whole sole of the foot to the ground in walking. The fur is very thick and coarse, and serves to protect the animal from the attacks of the bees, the nests of which it devastates. The colour is black on the under parts, on the muzzle, and limbs, whilst the tail, upper surface, sides, and neck are of grayish hue. The sides are marked each with a longitudinal gray stripe, extending into the tail. The claws are of strong make, and serve as agents in

the excavation of the burrows of these forms. These animals are of nocturnal habits, and prowls about chiefly by night (See fig at CARNIVORA). The Ratel of India is said to be carnivorous in its tastes, and is said even to devastate the burial grounds.

RATHENOW, or RATHENAU, a town in Prussia, in the government of Potsdam, and 32 miles north-west of the town of that name, on the right bank of the Havel, here crossed by a wooden bridge. It has a handsome Protestant church dating from the fourteenth century, an old city gateway, a statue of the Great Elector, a monument to the soldiers killed in the recent wars, a celebrated work in which optical instruments are manufactured, and works for wooden goods, machinery, large brick and tile works, &c. In 1675 the Swedes were here defeated by the Brandenburg general, Derfflinger. Pop (1900), 21,043.

RATHKELK, a market town of Ireland, in the county of Limerick, situated on the banks of the Deel, about 16 miles south west of Limerick. It contains a court house, union workhouse, and various places of worship. The only business done besides the retail trade of the town is the sale of agricultural produce at the weekly markets and fairs. It is a place of some antiquity. Pop (1891), 2078.

RATHLIN, or RACHLIN, formerly RAGHERY, an island and parish in Ireland, in the county of Antrim, and 6½ miles off the coast at the town of Ballycastle. On it are the remains of a castle, in which Robert Bruce took refuge when driven from Scotland by the success of Baliol. It is about 6½ miles long by 1½ broad, shaped like an arm bent at the elbow, area, 3399 acres. There are fine cliffs looking to the north and north west, and the surface rises to the height of 450 feet. It is fertile in parts, and its inhabitants are engaged in farming or fishing. Its fauna includes wild goats, choughs, and gyrfalcons. The people speak a dialect half Irish, half Gaelic. Pop 361.

RATIBOR, or RACIBORZ, a town of Prussian Silesia, in the government and 40 miles s s e of Oppeln, on the left bank of the Oder, which here becomes navigable and is crossed by an iron bridge (besides a railway bridge). It is the seat of important courts and offices, has a Protestant and two R. Catholic churches, a synagogue, a gymnasium and other schools, a deaf and dumb institution, &c. Among the articles with which its industries are concerned are tobacco, sugar, paper, machinery, nails, glass, iron castings, &c. It has an active trade by river and railway. Ratibor received town rights in 1217, and was formerly capital of a principality of same name. Pop (1895), 21,680, (1900), 25,236.

RATION, in the army and navy, is the allowance of provisions given to each officer, non commissioned officer, soldier, and sailor. In the British army the daily home ration is Meat, ¾ lb, bread (*best seconds*), 1 lb in barracks, 1½ lb in camp. Abroad the ration is Meat (fresh or salt), 1 lb, or ¾ lb preserved meat, bread, 1 lb, or biscuit, ¾ lb. Tea, sugar, coffee, &c., are not supplied as a public issue either at home or abroad, except at certain stations, and when in other cases they are issued, a stoppage of 1½d from the soldier's daily pay is made on account thereof. At some stations special rations are issued for sanitary reasons connected with the climate. During active service the ration may be according to climate and circumstances, but the standard is 1 lb meat, 1½ lb bread, or 1 lb biscuit or 1 lb flour, with tea, coffee, sugar, vegetables, &c. When a liquor ration is allowed the stoppage of pay is 1d. The families of soldiers accompanying them abroad receive fractions of rations: wife, ½, child under fourteen, ¼. A ration of forage at home for cavalry consists of 10 lbs. of oats, 12 lbs. of hay, and 8 lbs. straw for each horse.

In the British navy the daily ration is 1½ lb bis

cuit, or $1\frac{1}{2}$ lb soft bread, spirits, $\frac{1}{2}$ of a pint, or an equivalent in money, sugar, 2 oz., chocolate, 1 oz., tea, $\frac{1}{2}$ oz., when procurable, fresh meat, 1 lb., fresh vegetables, $\frac{1}{2}$ lb. If fresh provisions are not procurable salt pork, 1 lb., split pease, $\frac{1}{2}$ of a pint, or salt beef, 1 lb., flour, 9 oz., suet, $\frac{1}{2}$ oz., currants or raisins, $1\frac{1}{2}$ oz., besides a weekly allowance of oatmeal, $\frac{1}{2}$ pint, mustard, $\frac{1}{2}$ oz., pepper, $\frac{1}{2}$ oz., vinegar, $\frac{1}{2}$ pint. These are all issued to the sailor free, so that he is better off in this respect than the soldier, since the latter has to submit to a stoppage of pay on account of certain articles of diet.

RATIONALISM This term is commonly used at the present day as the equivalent of unbelief and disbelief in the truth of Christianity, but that is not its proper, historical meaning as determined by the time and circumstances of its first coming into use. It took its rise in Germany about the middle of the 18th century, and was first applied to the theological method and teaching of a certain class of divines in the German Protestant Church, who employed it as a weapon of defence against the attacks of Deism, in order to show that the charge of irrationality brought forward against Christianity was contrary to its history and teaching when these were properly understood. The first Rationalists called by that name were not professed infidels, although it is true that their principles from the first involved such fatal concessions to the spirit and method of deism that they fostered and strengthened it, instead of arresting its progress, and rapidly developed the views of many of the Rationalists themselves into full-formed and undisguised infidelity.

In his *Critical History of Free Thought* in reference to the Christian Religion, Dr Farrar, of the University of Durham, remarks (p. 589) that the word 'Rationalist' occurs in Clarendon, 1646 (*State Papers*, vol. II p. 40), to describe a party of Presbyterians who appealed only to 'what their reason dictates to them in church and state'. The treatise of Locke, on the Reasonableness of Christianity, 'caused Christians and Deists to appropriate the term and to restrict it to religion. Thus by Waterland's time it had got the meaning of false reasoning on religion' (*Works*, viii. 67), and, passing into Germany, it appears to have become the common name to express philosophical views of religion as opposed to supernatural.

During the period when Rationalism was predominant as a method in German theology the meaning and limits of the term were freely discussed. The discussion was not a verbal one only, but was intimately connected with facts. The Rationalist theologians wished to define clearly their own position, as opposed on the one hand to Deists and Naturalists, and on the other to Supernaturalists. Rationalism, as thus defined, stands distinguished from Naturalism or Deism by having reference to the Christian religion and church, but it differs from Supernaturalism in that reason, not Scripture, is its "formal principle" or test of truth, and virtue, instead of "faith working by love," is its "material principle" or fundamental doctrine.

It is a remarkable fact that the rise of Rationalism, though not under that technical name, took place not in Germany, but in England. In its extreme form and results, as Deism or Naturalism, its first English examples were Lord Herbert of Cherbury, Hobbes, and Blount (*Oracles of Reason*), while in its milder and less developed form as a theological method adopted and applied by men still claiming the Christian name, it appeared implicitly, if not expressly and formally, in many of the later writings of the latitudinarian party of the Church of England. This Latitudinarianism, both in doctrine and ecclesiastical views, was a reaction which sprang up in

the second half of the seventeenth century against that exclusive appeal to authority, scriptural or churchly, or both combined, which had been in the ascendant during the preceding hundred years, and its characteristic principle was the assertion of the prerogative and right of reason to decide on all questions of religion and morals—not to the exclusion of the principle of authority, but side by side with authority, reason having a legitimate jurisdiction of its own, for which it claimed due recognition and regard. But what was to be thought, more precisely, of the place and extent of this jurisdiction of reason? Was it to be regarded as *subordinate* to that of the authority of the Holy Scriptures (to say nothing of church authority), or as *co-ordinate*, or as *superior* and even *supreme*? If subordinate, to what extent or within what limits? If co-ordinate, how were the two equal jurisdictions to be reconciled and harmonized, and how were the needful concessions on either side, or both, to be managed? If superior or supreme, how were the claims of faith to be conserved side by side with those of reason, and how was the authority of the word of God as the law of Christian life to be maintained in conflict with the word of man, with the philosophy of books and of schools?

It was inevitable that the discussion of such vital and far-reaching questions should give rise to two parties among the Latitudinarians themselves—a conservative party and a progressive party, and that both these parties should exhibit all degrees of moderation and extremeness. It was no less inevitable that in such a prepared condition of men's minds on the debatable grand question of the relations of faith and reason, of man's philosophy and God's revelation, the new philosophies which had arisen in the seventeenth century—those of Bacon and Descartes—and which were to follow in the eighteenth century—those of Locke, and Leibnitz, and Kant—should exercise immense influence, and work enormous changes in the direction both of theological Rationalism and of anti-Christian disbelief.

For a full and very learned and able account of the bearings and effects of all these philosophies upon the theology and religion of England, France, and Germany, the reader is referred to Professor Farrar's work already mentioned, and for many valuable additions to that portion of the work which treats of the English Deists who began by being Rationalists, he is advised to consult Dr Mansel's review of Dr Farrar's volume, first published in the *Quarterly Review*, July, 1864, and afterwards in the posthumous collection of his *Letters, Lectures, and Reviews* (1873), under the title of *Free thinking, its History and Tendencies*, which treats with special fulness of the English Deists, Toland, Collins, Tindal, Woolston, Morgan, Chubb, and Annet. In this valuable essay—which was written as a corrective and counteractive to one of the essays in the famous volume of *Essays and Reviews*, published in 1860 (that by Mark Pattison, B.D., on *Tendencies of Religious Thought in England, 1688–1750*)—Dr Mansel has pointed out, with great metaphysical acumen, the dependence of the Rationalism of Toland, the first of the series, upon the philosophy of Locke. 'Toland, the disciple of Locke, found a criterion of religious truth in the principles, or what he supposed to be the principles, of his master. "The exact conformity of our ideas with their objects" was his ground of persuasion and measure of belief, the origin and nature of these ideas being explained according to the philosophy of Locke. Locke, indeed, wrote his great work without reference to theology, and probably without any distinct thought of its theological bearings. When challenged on account of the relation of his premises to Toland's conclusions he expressly repudiated the connection,

and declared his own sincere belief in those mysteries of the Christian faith which Toland had assailed. No one who knows anything of Locke's character will doubt for an instant the sincerity of this disclaimer, but our question does not relate to Locke's personal belief, but to the admissions which may be unconsciously involved in some of the positions of his philosophy, and which, perhaps, had they been foreseen, might have led to a modification of those positions themselves. This relation of Toland to Locke is a question of far more than mere historical interest. It is a question affecting the character of English theology during the greater part of the eighteenth century, it marks the point of departure at which the religious teaching of that century separates from that of the preceding age, it helps to explain the difference, which no student can fail to observe, between the one and the other. When the system of Locke became the reigning philosophy of the day, it numbered disciples among believers and unbelievers alike, and the later apologists were thereby enabled to contend with the free thinkers on their own ground and with their own weapons. In this they employed his philosophy for the purpose for which he would himself have wished it to be employed, and they adopted the most effectual means of obtaining an immediate triumph over their antagonists. But they broke off, perhaps unconsciously to themselves, from that grand old Catholic theology which had been the glory of the English Church in the preceding centuries, and the point of their separation, apparently minute and indifferent in itself, was in fact the leaven which has leavened the whole course of English religious thought, for good or for evil, ever since the specific evil here referred to, being in all its degrees and effects the *rationalizing* of religious thought, the disintegration and vitiation of the system of Christian truth, by the undue encroachments of the prerogative of reason within the domain of divine teaching and truth.

In the following passages of his essay Dr Mansel exhibits in a very instructive manner the downward movement of English Rationalism in the first half of the 18th century, a period of transition which has a peculiar interest for us, as being in many respects the counterpart of the period through which our nation is passing at the present time. 'The first step in the Rationalism of that age was an attempt to eliminate from the doctrines of Christianity all that is above the comprehension of human reason, the second was an attempt to eliminate from the contents of Christianity all statements of facts which cannot be verified by each man's personal experience, the third was an attempt to get rid of Christianity altogether, as having no proper claim to respect and obedience—"No dogmatic Christianity" may be taken as the watchword of the first stage, "No historical Christianity" as that of the second, "No Christianity at all" as that of the third. The representative book of the first period was Toland's *Christianity Not Mysterious*, of the second, Chubb's *True Gospel of Jesus Christ Asserted*, of the third, Bolingbroke's *Essays and Fragments*. The first represents revealed religion as brought down to the level of philosophical speculation, and to be tried by philosophical tests, the second subjects it to the rough common sense of the many, the third represents it as tried and condemned by the verdict of the scorner and the profligate. The tendency of Locke's philosophy, as applied to religious belief, pointed in two directions, first to a distrust of, if not to an actual disbelief in, the mysterious and incomprehensible as a part of religious belief, secondly, to a depreciation of distinctive doctrines in general, as at least unessential, and to a dislike of them as impediments to compre-

hensive communion. Both these tendencies found their gradual development in the religious thought of the succeeding generation. The open denial of mysteries commenced by Toland was carried on in a coarser strain by Collins, the personal friend and warm admirer of Locke, but a man of a very different spirit. From the mysterious in doctrines the assault was extended to the supernatural in facts, in the attacks of Collins on the prophecies, and of Woolston on the miracles. And finally, when the supernatural had thus been entirely eradicated from Christian belief, the authority of the teachers naturally fell with the evidences of their divine mission, and Christianity in the hands of Tindal and Morgan appears simply as a scheme of natural religion, to be accepted, so far as it is accepted at all, solely on the ground of its agreement with the conclusions of human reason, but having no special doctrines of its own distinct from those discoverable by the light of nature, and no special authority of its own, as a ground on which it can lay claim to belief.

All these results of English Rationalism had developed themselves before the middle of the 18th century—and it was only about that date that German Rationalism began a career which bore a remarkable resemblance to that of its English precursor, both in the causes, intellectual and moral, which produced it, and in the rapidity and fatal effects of the movement by which it was spread over the whole extent of the German Protestant Church, both Lutheran and Reformed. For full information of the rise and progress and successive stages of German Rationalism, the reader must have recourse to German sources—such as Tholuck's *History of Rationalism*, Dorner's *History of Protestant Theology in Germany from the Reformation to our own Age*, and Karl Schwarz's *History of the Newest Theology*. These are all works of high authority, and the fruits of lengthened and able research at the primary sources of information. As to English books, in addition to Dr Farrar's *Bampton Lectures*, before referred to, two other works chiefly contributed to call attention in this country to the subject, namely, that of Hugh James Rose, on the *State of the Protestant Religion in Germany*, in a series of discourses preached before the University of Cambridge in 1825, and a work of Dr Pusey, in reply to Mr Rose, entitled *An Historical Inquiry into the Probable Causes of the Rationalist Character lately predominant in the Theology of Germany*, to which work was prefixed a letter from Professor Sack, of Bonn, on the discourses of Mr Rose. This appeared in 1828, and was followed by a second part in 1830, which vindicated the opinions expressed in the first part against the misconceptions of Mr Rose.

One of the earliest causes which conspired to generate Rationalism in Germany was the introduction into the country of English Deism. 'The connection of England with Hanover had caused several of the works of the English Deists to be translated in Germany, and the general doctrines of natural religion expressed by Herbert and Toland were soon reproduced, together with the difficulties put forth by Tindal. But the direct effect of this cause, in Professor Farrar's judgment, 'has probably been exaggerated by the eagerness of those who, in the wish to identify German Rationalism with English Deism, have ignorantly overlooked the wide differences in premises, if not results, which separated them, and the regular internal law of logical development which has presided over the German movement.'

The philosophy of Wolff, which became universally dominant in the German schools about the middle of the century, had much more to do in

preparing the way for Rationalism than any importation of foreign literature either from England or France. 'Wolff was a disciple of Leibnitz, great as a teacher rather than an inventor, who invested the system of his master, slightly modified, with the precision of form which raised it to rivalry with the perfect symmetry of Spinoza's system. Its orderly method possessed the fascination which belongs to any encyclopaedic view of human knowledge.' But Wolff was an orthodox Christian, it was only in an indirect way that his philosophy exercised a sinister influence upon theology. 'The evil effects which it subsequently produced in reference to religion,' as Farrar observes, 'were due only to the point of view which it ultimately induced. Like Locke's work on *The Reasonableness of Christianity*, it stimulated intellectual speculation concerning revelation. By suggesting attempts to deduce *a priori* the necessary character of religious truths, it turned men's attention more than ever away from spiritual religion to theology. The attempt to demonstrate everything caused dogmas to be viewed apart from their practical aspect, and men being compelled to discard the previous method of drawing philosophy out of Scripture, an independent philosophy was created, and Scripture compared with its discoveries. Philosophy no longer relied on Scripture, but Scripture rested upon philosophy. Dogmatic theology was more a part of metaphysical philosophy. This was the mode in which Wolff's philosophy ministered indirectly to the creation of the disposition to make scriptural dogmas submit to reason, which was denominated Rationalism. The empire of it was undisputed during the whole of the middle part of the century, until it was expelled towards the close by the partial introduction of Locke's philosophy and of the system of Kant.'

The theological movement which sprang up in Germany under the operation of these influences—to some extent of foreign origin, but much more largely of native growth, is that which is denoted by the current term German Rationalism—and it admits, as the same author observes, of a natural division into three parts. The *first*, a period *destructive* in its tendency, extending to a little later than the end of the century, exhibits the gradual growth of the system, and its spread over every department of theology. The *second*, reconstructive in character—the re-establishment of harmony between faith and reason, extends till the publication of Strauss's celebrated work on the Life of Christ in 1835, the *third*, containing the divergent tendencies which have created permanent schools, reaches to the present time. A distinguished name stands at the commencement of each period, representing the mind whose speculations were most influential in giving form to the movements. Semler inaugurated the destructive movement, Schleiermacher the constructive, and Strauss precipitated the final forms which theological parties have assumed. Such is the outline of the history of Rationalism in Germany, which it is, of course, impossible for us to fill in with all the necessary particulars within the limits of this article. All that can be done is to call the reader's attention in succession to the three distinguished names just enumerated, and even this little must be done very succinctly, referring for further biographical information respecting them to the several articles which treat of them further on in this work.

The destructive influence of Semler was chiefly felt from 1750 to the end of the century. He is the true type of a 'Rationalist'—still a theologian and a professed Christian, but no longer such in the old sense of Reformation times—in the sense in which Luther and Calvin were Christians and divines, but

in the sense of being first a man of reason and only next a man of faith, of being first a philosopher and next a divine, as far as his philosophy would allow—a middle term in short, a connecting-link or conductor between Christian faith and its opposite, anti-Christian disbelief. He had been brought up among the Pietists of the school of Spener and Francke, but when appointed to a theological chair in the Pietistic University of Halle his teaching became more and more a reaction against the principles and spirit of that devout but unscientific school, and occupying himself chiefly with the criticism and exegesis of the Bible he became the first to introduce that destructive style of treatment in both these branches of theology which afterwards reached such extremes of irreverence and violence in the critical and exegetical productions of Eichhorn in the Old Testament and Paulus in the New. It was Semler in particular who originated and introduced the destructive method of interpretation known by the name of 'accommodation,' his motive being to meet the difficulties and objections raised by the Deists to many of the biblical narratives and doctrines 'by separating the eternal truth in Scripture from what he considered to be local and temporary.' All the narratives, for example, of demoniacal possessions, and the miracles wrought by our Lord and his apostles in such cases, Semler regarded as 'intentional accommodations on the part of the teachers to their hearers.' He went so far as to consider some of the doctrines of the New Testament to be an accommodation on the part of our Lord to Jewish notions, resolving Christ's teaching and work into a compromise between the Mosaic and philosophical parties in the Jewish Church. He founded no school, but his influence, in the words of Professor Farrar, 'decidedly initiated the Rationalist movement within the church, one peculiarity of which will be found to be that it was professedly designed in defence of the church, not as an attack upon it.' In addition to the names of Eichhorn and Paulus already given as belonging to the most advanced critics and exegetes of this first period of Rationalism, those of Rohr and Wegscheider were also prominent—the former in the pulpit, the latter as a professor, in Halle, of dogmatics.

Schleiermacher was a Rationalist of a very different type from Semler—so different, indeed, in many of the tendencies and effects of his teaching, that it is not without hesitation that we apply to him the same generic name. In fact it was his teaching and influence more than those of any other man which arrested the progress and finally prevailed over the sway of the older form of German Rationalism just described—what was termed *vulgar* Rationalism, or the Rationalism of common sense. But he substituted for it what was in effect a Rationalism of another though a more spiritual kind, the Rationalism of what he called the *religious consciousness* of the human mind and the *collective Christian consciousness* of the early church. That is to say, he made this human consciousness—in both forms, rational and Christian—the ultimate and supreme standard of religious truth. Luther and the other reformers had made the Holy Scriptures the supreme standard of such truth, and to substitute for the Scriptures as that standard even the religious consciousness of the human mind as shaped by primitive Christian traditions, was only to introduce a Rationalism of a new though less destructive species, and to lay the authority of God's Word at the feet of human authority, with an abatement amounting to no more than this—that the human judge thus placed in the supreme seat had previously received some Christian tincture of subjective view and feeling from the writings and doctrines on which he was to sit in judgment.

The far-reaching effects of this Rationalistic mode of thought appeared in the Reconstruction of Christian Truth, which he substituted for the work of demolition which had been so ruthlessly carried out by Semler and other predecessors. It followed from his making the collective Christian consciousness the last standard of appeal in Christianity that 'dependence on apostolic teaching was not the appeal to an external authority, but merely to that which was the best exponent of the early religious consciousness of Christendom in its purest age. The New Testament was written for believers, appealing to their religious consciousness, not dictating to it. Inspiration is not indeed thus reduced to genius, but to the religious consciousness, and is different only in degree, and not in kind, from the pious intuitions of saintly men. The Bible becomes the record of religious truth, not its vehicle—a witness to the Christian consciousness of apostolic times, not an external standard for all time.' 'From this point we may see how his views of doctrine, as well as his criticism of Scripture, were affected by his theory. For in his view of fundamental doctrines, such as sin and the redeeming work of Christ, inasmuch as his appeal was made to the collective consciousness, those aspects of doctrine only were regarded as important or essential which were appropriated by the consciousness, or understood by it. Sin was accordingly presented rather as unholiness than as guilt before God, redemption, rather as sanctification than as justification, Christ's death, as a mere subordinate act in his life of self sacrifice, not the one oblation for the world's sin, atonement regarded to be the setting forth of the union of God with man, and the mode of arriving at a state of salvation, to be a restoration of the union of man with God through a kind of mystical conception of the brotherhood of Christ. Hence, as might be expected, the dogmatic reality of such doctrines as the Trinity was weakened. The deity of the Son, as distinct from his superhuman character, became unimportant, save as the historical embodiment of the ideal union of God with humanity. The Spirit was viewed not as a personal agent, but as a living activity, having its seat in the Christian consciousness of the church. The objective in each case was absorbed in the spiritual, as formerly in the old Rationalism it had been degraded into the natural. It followed also that the Christian consciousness, thus able to find, as it were, a philosophy of religion and of the material apprehended by the consciousness of inspired men, possessed an instinct to distinguish the unimportant from the important in Scripture, and valued more highly the eternal ideas intended than the historic garb under which they were presented—the ideological tendency, as it is now called' (Farrar).

Such a reconstruction of Christian doctrine was highly imperfect and erroneous, its errors being entirely due to the Rationalistic principle which lay at its foundation. Still, it was a reconstruction, so far as it went, compared with the purely negative and destructive work of the older Rationalistic schools both of England and Germany. Schleiermacher's influence had at least the effect of reawakening religious aspirations in the German mind. His powerful genius, early baptized with deep devotional fervour, and wielding all the weapons of the highest culture and the most advanced learning, gave a strong impulse to many of the most gifted minds of Germany in the direction of a return to the faith of Luther and Melancthon. 'Men caught his deep love to a personal Christ without imbibing his doctrinal opinions. His own views became more evangelical as his life went on, and the views of his disciples more deeply scriptural than those of their master.'

The period of Schleiermacher's immediate influence, which began in 1799 with the publication of his famous *Reden über die Religion an die Gebildeten unter ihren Verächtern* (Discourses on Religion addressed to the Educated among its Despisers), may be said to have closed in 1835, when Strauss published his *Leben Jesu*, and it is a melancholy example of the evil side of Schleiermacher's influence that it was his lectures on the life of Christ, heard by Strauss at Berlin in 1831, and described by Karl Schwarz in his *History of the Newest Theology* as 'full of destructive scepticism,' which gave Strauss the first impulse to the composition of his celebrated work.

When Strauss drew up the *Leben Jesu* in its earlier form he was still in some sense a Christian and a theologian—or at least was willing to be so regarded. 'His work was constructed on Schleiermacher's *ideological* principle, which abandoned the historical importance of miracles as compared with the ideas or doctrines which were embodied in these, but without guaranteeing the historical reality of the miraculous facts. He was in truth an Idealist and Ideologist, of the school of Hegel as well as of Schleiermacher, and there was a certain gnostical sense in which, like Hegel himself, he still fancied himself to be a Christian theologian as well as a critic and philosopher.' But in his last work, *The Old Faith and the New*, addressed to his disciples, he put the plain question, Are we still Christians? and answered it in the negative. In more recent times the rationalistic tendency has chiefly manifested itself in the literary and historical criticism of the Bible, and already many of the conclusions of the 'higher criticism', though formerly regarded as excessively rationalistic, have been generally accepted.

Rationalism has made great advances in Britain during the nineteenth century, and it has profoundly influenced the modes of thinking of all religious sects. This rationalism has manifested itself not only as a critical and in part destructive movement, but also as a constructive movement, having for its aim the substitution of immediate spiritual religion for the religions which depend on external authority of any kind. It is, in fact, an attempt to strip the lofty theism of Christianity of what are regarded as its imperfections inherited from past ages of greater superstition and narrower outlook than ours, and to disengage the transcendent personality of Jesus from what are considered to be the accretions of credulity. On the critical side the great names in British rationalism include those of Bishop Colenso (*The Pentateuch and Book of Joshua*, 1862-79), Professor Robertson Smith, Dr Samuel Davidson, Matthew Arnold, Canon Driver, and Canon Cheyne, and the movement culminates in the publication of the *Encyclopædia Biblica* (1900 onwards). Among lives of Jesus of rationalist tendency Seeley's *Ecce Homo* (1865) is notable, and among the British leaders in the rationalistic reconstruction of theology during the century have been Coleridge, James Martineau, F. D. Maurice, John Caird, F. W. Newman, Stopford Brooke, Mark Pattison, and others. The great rationalists of the United States, all mainly constructive, were W. E. Channing, R. W. Emerson, Theodore Parker, and John Fiske. Religious rationalism is but one of the many manifestations of what is called the scientific and historical spirit. This spirit has often led to agnosticism, but many to-day find in the system of Herbert Spencer, who is generally called agnostic, an impregnable basis for pure theism.

Besides the works above referred to, the following may be recommended: Mackay's *The Tübingen School and its Antecedents* (1863), Lecky's *History*

of Rationalism in Europe (1865), Hurst's History of Rationalism (1866), Fisher's Faith and Rationalism (1879), Tulloch's Rational Theology and Christian Philosophy in England in the 17th Century (1872), and Movements of Religious Thought (1885), Draper's Intellectual Development of Europe (1867), and Conflict between Religion and Science (1874), Pfleiderer's Development of Theology in Germany since Kant (1890), and Bechtel's Die Positive Theologie und der Moderne Rationalismus (1894)

RATISBON (German, *Regensburg*), a town of Bavaria, near the centre of the kingdom, capital of the province of Oberpfalz (Upper Palatinate), on the right bank of the Danube, here crossed by a stone bridge of 15 arches, about 1100 feet long (leading to the suburb of Stadt am Hof), and opposite the junction of the Regen, 65 miles N N E. of Munich. It is very irregularly built, and the streets are generally narrow and winding. The houses are more venerable for their antiquity than remarkable for architectural merit, though many of them have an imposing appearance, rendered more striking by the lofty loop-holed towers by which they are surmounted. There are, however, several spacious and handsome streets and squares, and pleasure-grounds on the site of the old ramparts. The most remarkable public buildings are the cathedral, founded in 1275, which ranks as one of the finest Gothic edifices in Germany, with a lofty and imposing front, two modern open work towers, a richly sculptured portal, and an interior arranged with much simplicity and in excellent taste, containing interesting monuments, and lighted by beautifully painted windows, the Romanesque church of St. Emmeran, with detached belfry, the church of St. Ulrich (begun in 1250), the church of the old monastery of Irish Benedictines, and the church of Obermunster, the abbey of St. Emmeran, a large pile of buildings, now converted into an extensive but not handsome palace of the princes of Thurn and Taxis, the town house, a gloomy, irregular structure, adorned with a beautiful Gothic portal, and historically interesting as the place in which, for a century and a half, the imperial diets were held (1663-1806), the episcopal palace, the mint, theatre, synagogue, public library, antiquarian museum, lyceum, seminary, two gymnasiums, picture gallery, blind asylum, &c. Ratisbon possesses many ornamental fountains, and several monuments. The manufactures embrace lead and other pencils, porcelain and stone ware, hosiery, woollen cloth, leather and articles in leather, machinery and hardware, gloves, sugar, and tobacco. There are also book printing establishments, breweries and distilleries, shipbuilding yards, and numerous other works. The trade, for which the Danube, with the steamboats that ply upon it, affords admirable facilities, is of great importance, and includes a good deal of transit. The principal articles, in addition to the above articles of manufacture, are salt, wood, and corn. About 6 miles to the east, on the summit of a hill, is the celebrated Walhalla (which see). Ratisbon is an ancient place, having been a Celtic town with the name of *Radasbona*. It acquired considerable importance under the Romans, but all the buildings erected by them have disappeared, with exception of the remains of an old Roman city gateway, and a square, massive tower, of rough masonry. In more modern times it became the residence of the old dukes of Bavaria, then rose to the rank of a free imperial city, and continued long to be the chosen seat of the imperial diets. Before the discoveries of modern navigators opened a new way to the East, it was the chief emporium for its produce, but soon after these discoveries trade opened for itself other channels, and Ratisbon fell rapidly into decay. It has repeatedly

suffered much from the ravages of war. The sieges which it has stood number no less than seventeen, and were often accompanied with bombardments. Of these, the last and perhaps most disastrous was in 1809, when, after an obstinate defence by the Austrians, it was stormed by the French. Pop. (1890), 37,567, (1895), 41,671, (1900), 45,426.

RATITÆ, Huxley's second division of birds, including the Ostriches and other Cursorial or Running Birds, so named from the raft-like or flattened character of their breast bone, which is destitute of a prominent keel or ridge. The *Carinate* birds, including all other living birds, are those in which the breast-bone possesses such a keel, to which the pectoral or wing muscles are attached. The wings in the Ratitæ are rudimentary, and hence the powers of flight bear an evident relation to the degree of development of the sternal keel. Huxley's third division of birds is that of the *Saururæ*, which includes the fossil and extinct *Archæopteryx*. See ORNITHOLOGY.

RATLINES, small lines which traverse the shrouds of a ship horizontally, at regular distances of about 15 to 16 inches, from the deck upwards, forming a variety of ladders reaching to the mast heads.

RAT MOLE. See *ITAT*.

RATTAN CANES are produced by a species of *Calamus*, a genus of the order of Palms. The species have all perennial, long, round, solid, jointing, unbranching stems, extremely tough and pliable, often ascending among the branches of trees. They grow in profusion along the banks of rivers in tropical Asia and the neighbouring islands. All the species are very useful, and are applied to various purposes, the fruit and young stems of all furnish nutriment, and a drink is obtained from the liquid which flows from wounds in the spadix. One species is even cultivated for its fruit, which is the size of a walnut, and covered with scales. Certain species furnish cables, cords, and withes of exceeding strength. *Calamus Rotang*, *C. Zolacca*, and *C. rudentum* supply Malacca and Rattan canes. *Partridge canes*, and those called *Penang lawyers*, are also the produce of species of *Calamus*. The stems of *C. rudentum* are said to attain a height of 500 feet. The quantity of rattans annually imported into Great Britain is very great, they are extensively used in chair making.

RATTANY (or *RATANHIA*) **ROOT**, the root of the *Krameria triandra*, the *K. Izna*, and other sorts of *Krameria*, plants allied to the natural order Polygalæ, and growing wild in the mountains of Peru, Bolivia, and other parts of South America. The dried root is valued for its powerful astringent and tonic properties, and is also used as a tooth powder mixed with charcoal. One of the best sorts is the *Savanilla rattany*, which is brought from Colombia. A saturated tincture of rattany root in brandy is called wine colouring, and is used in Portugal to give roughness to port wines.

RATTLESNAKE, a species of serpents belonging to the Viperine division of the order Ophidia, a division distinguished by all its members possessing no solid or ordinary teeth in the upper jaw, which is provided with two hollow or canaliculated fangs, grooved and pierced for the transmission of the fluid of poison glands. The lower jaw possesses teeth of ordinary kind. The head is broad and of triangular shape, being broadest behind, and the scales of the head are generally of small size. The Rattlesnakes of themselves form the family *Crotalidæ*, and possess representatives in warm and tropical regions, other than North America, where these snakes are chiefly found. The *Crotalidæ* possess a deep sulcus or pit on each side of the nose, beneath each nostril. Each pit, the functions of which are unknown, is lined by small scales. The head is broad and flattened, and the

abdomen is invested by broad scuta or shield-like scales. The fangs are of large size in these snakes, which are more particularly characterized by the presence of certain peculiar epidermic or skin appendages attached to the tail. These appendages, constituting the 'rattle' of these serpents, consist of a series of loosely articulated horny cells of pyramidal shape, which make a rattling noise on the animal moving about. The number of pieces in this rattle are said to increase according to the age of the animal, a new segment being said to be added after each change or moulting of the skin. The use or function of this peculiar apparatus has not been accurately determined. The former idea of its constituting a kind of warning rattle to advise humanity of the vicinity of these creatures, cannot be entertained, on the reasonable ground that 'Providence' cannot be credited with arming an animal to its own obvious disadvantage. On the other hand it is said that the rattle imitates the note of an insect known as the Cicada, and that birds swooping down to seize the supposed insect are caught by the snake, while it has also been suggested that the rattle may be used to startle marmots, squirrels, and other small animals out of their burrows, so as to give the snake an opportunity of seizing them. This latter idea is also inappropriate, the movements of these snakes being slow and lethargic. It is probable the rattle may be used as a sexual call, and may sound when the reptile is irritated. The Common Rattlesnake (*Crotalus horridus*) averages in length from 4 to 6 feet, but occasionally specimens measuring 8 or more feet in length have been met with. The head is of a brown colour, the eye being red. The upper parts are of yellowish-brown colour, marked with irregularly shaped broad bands of black colour. This form chiefly inhabits Virginia, Carolina, and neighbouring states of North America. The bite is very dangerous when effectively delivered, the poison being of very virulent nature. This snake does not bite unless much provoked, and will rather avoid man than face him. The rattlesnake feeds on dead birds, seeming to prefer dead animals to the living forms. These snakes mostly abound in dry sandy places, and particularly in hilly situations. The Indians are said to possess effective antidotes for the bite of this snake, but it is doubtful if these much-vaunted remedies are to be trusted in preference to the more rational and open treatment of medical science. These serpents have greatly decreased in localities where they formerly abounded, in consequence of the extension of civilizing influences. A very curious circumstance in connection with these serpents may be lastly mentioned, this circumstance being the apparent antipathy which these forms possess to the leaves of the White Ash-tree (*Frazinus Americana*). Various experiments made with these leaves have shown that a rattlesnake brought into proximity with these leaves was thrown into violent contortions, and did not offer to strike, as it did when similarly treated with leaves of a sugar maple. No explanation can yet be afforded of this and analogous antipathies exhibited by certain animals to certain substances or even to other animal forms. See illustrations at REPTILIA.

The family *Crotalidae* includes other forms in which no rattles exist, such as the dreaded *Craspedocephalus lanceolatus* of the West Indies, the tail of which possesses a spine, and the poison of which is exceedingly active.

RAUCH, CHRISTIAN, an eminent German sculptor, was born of humble parentage in Arolsen, the capital of the Principality of Waldeck, on 2d Jan. 1777, and having early displayed a turn for model

Ruhl, residing at Cassel. At the age of twenty he proceeded to Berlin to take possession of the effects of a brother just deceased, who had acted as one of the royal lackeys, a situation to which Rauch now succeeded. In this occupation he had frequently an opportunity of seeing Queen Louisa, and was induced to attempt forming a clay bust of her, which, when completed, was shown to her and King Frederick William III. They sent him to study under the sculptor Schadow, and afterwards at Dresden, in the Mengs collection of plaster casts from the antique. In 1804 Rauch proceeded to Rome, where he made the acquaintance of Thorwaldsen and Canova, and obtained the patronage of Wilhelm von Humboldt, the Prussian minister. Having executed here several successful works, he received an invitation in 1811 from the king to come to Berlin to design a mausoleum for Queen Louisa, who had recently died. This behest was accomplished by him, and in 1814 his celebrated statue of the queen was deposited in the mausoleum at Charlottenburg. His fame was now established, and orders for busts and monumental works flowed upon him from all quarters. Among his *chefs d'œuvre* may be mentioned more especially the monument of King Frederick William III., adjoining that of Queen Louisa, in the Charlottenburg mausoleum; the colossal equestrian statue of Frederick the Great, opposite the Prince of Prussia's palace at Berlin, the marble statues of Blücher and Scharnhorst, the bronze ones of Blücher, Gneisenau, and York, the six colossal figures of Victory in the Walhalla, and a group representing Moses with his hands supported by Aaron and Hur. After enjoying a long and prosperous career Rauch was at last attacked by the stone, and visited Dresden with the view of submitting to a surgical operation for its removal. This, however, from his advanced age, was not deemed advisable, and he expired on 3d December, 1857.

RAUHES HAUS, an educational and benevolent institution at Horn, near Hamburg, founded and long superintended by Dr J H Wichern, opened 1st November, 1833. It is in connection with the German Home Mission, and besides forming a refuge for neglected children, receives boarders (male and female) from the higher classes, and serves as a training school for those wishing to become teachers, superintendents, or assistants in hospitals, reformatories, houses of correction, and the like. The first foundation of this institution, which has already become a model for others in Germany, France, England, and Holland, was laid by a wealthy citizen of Hamburg, who bequeathed to it a piece of land. It was opened at first with only twelve neglected children, but gradually more land has been acquired and new buildings have been erected, and the establishment has all the appearance of a compact little colony. It is supported partly by voluntary subscription, the profits arising from the manufactures and business carried on in connection with it, and the fees of the richer pupils. At a recent date over 100 poor children (two thirds of whom were boys) were receiving instruction within its walls. They live in families of twelve, each family being under the care of a young artisan, who employs the children according to their capabilities in indoor or outdoor work. The educational department is in the hands of assistants, who also take part in the instruction of the institution in order to prepare themselves for the work of the Home Mission in other localities. The whole staff of assistants, consisting of young men of twenty to twenty-nine years of age, are formed into a kind of society, and receive a three years' training in the institution. They receive board and clothing, but no salary. Since 1844 the institution

has carried on a printing and bookbinding business, to which was added (in 1849) a bookselling establishment, situated in Hamburg.

RAUPACH, ERNST BENJAMIN SALOMO, one of the most prolific dramatic poets of Germany, born in 1784 at Straupitz, not far from Liegnitz, attended the gymnasium of the latter town, and proceeded in 1801 to Halle to study theology. He afterwards went as a tutor to Russia, and in 1816 obtained a chair in the University of St Petersburg, but in consequence of a quarrel with his colleagues finally quitted the country in 1822, and after various changes finally settled in Berlin, where he employed himself chiefly in writing for the stage, and died in 1852. He also published two collections of tales (in 1820 and 1833), which met with little success. His dramatic works have been collected and published in two divisions, the one containing his comic pieces, under the name of *Dramatische Werke komischer Gattung* (three vols. Hamburg, 1828-34), and the other, his more serious or tragic pieces, under the name of *Dramatische Werke ernster Gattung*, amounting to no fewer than eighteen volumes. His productions display considerable knowledge of stage effect, great creative power, and a wealth of verbal wit. A life of the dramatist was published by Pauline Raupach (Berlin, 1854).

RAVAILLAC, FRANÇOIS, the murderer of Henry IV of France, born at Tournes, near Angoulême, in 1578. He commenced life under unfavourable circumstances. His father was ruined by litigation, and François lived for the first year of his existence on the charity of his neighbours. He became successively valet to an attorney, in which situation he learned to read and write, attorney's clerk, and schoolmaster. He could never succeed in making both ends meet, however, and was thrown into Angoulême prison for debt, where he remained for a considerable time. At last he was released, and turned out into the world a beggar. He took service in the order of the Feuillants, but was expelled shortly afterwards as a visionary. His naturally gloomy disposition degenerated into a wild fanaticism when he began to meddle in religious controversies, which at that time continued to distract his unhappy country. Filled with hatred of the new doctrines, he became accustomed to consider King Henry as the arch enemy of the church, to destroy whom would be a meritorious work. May 14, 1610, he succeeded in his purpose. (See HENRY IV.) He was seized, condemned to death, and underwent his sentence on the 27th of May. He died under the severest torture, of more than an hour's duration, which he endured with tranquillity, as he had done the rack, and without betraying any especial repentance or naming any accomplices.

RAVELIN, in fortification, was anciently a flat bastion placed in the middle of a curtain, but is now a detached work, composed only of two faces, which make a salient angle, and raised before the curtain on the counterscarp of the place. A ravelin is a triangular work, resembling the point of a bastion with the flanks cut off, and has superseded the old crescent shaped demi-lune. See FORTIFICATION.

RAVEN (*Corvus corax*), a species of *Corvinæ* or true Crows, included with that division in the Com rostral section of the order Insectores (which see). The upper mandible in this form has no teeth or serrations at its apex, and the ridge of this mandible is more or less curved. The wings are long and slightly rounded. The raven is the largest species of its group, and is of black colour, although the plumage exhibits when variously viewed metallic tints and lustres. The colour of the female is less deep than that of the male, the bill being less stout

and smaller, and the body being generally of lighter build. The plumage in the young state is not so jet black as in the adult. The tongue is black in colour, and bifid or forked at its tip.

These birds are well known for their instincts and sagacity, and have before now suggested to both poet and novelist many interesting traits of comparative kind, when brought into relation with the ways of humanity itself. Dickens' Grip affords an example of a raven of fiction, which has its counterpart in many living and actual examples. They may be successfully taught to imitate closely the human voice, and to speak distinctly. These birds are very courageous, and will attack and repel invaders on their own domains. They are known to attack living animals, such as frogs and rats, rabbits, &c., and may even kill other birds, although the stories told of their attacking young lambs certainly require confirmation. The eggs, numbering five or six, of a pale green or blue with brown spots, are laid in March, both male and female incubate, and the young are hatched after about twenty days. In May the young can fly about and provide for themselves. These birds are said to attain in some cases to a long age, and occur throughout Europe, being also found in North America and in the Polar regions.

RAVENNA, a town of Italy, capital of the province of the same name, on the left bank of the Montone, near the confluence of the Ronco, about 4 miles west of the Adriatic, and 43 miles east by south of Bologna, and connected by a branch line with the Milan and Brindisi Railway. It stands in a marshy district, and is surrounded by earthen ramparts, has a circuit of about 3 miles, and has a dull appearance, though many of its houses are handsome, and its streets are in general regular and spacious. The principal edifices are the cathedral, founded in the fourth but rebuilt during the seventeenth century, and adorned with some of Guido's finest paintings, the ancient baptistery, an octagonal structure, separated from the cathedral by a street, the Basilica of San Vitale, in the pure Byzantine style, with all the accessories of eastern splendour, built in the reign of Justinian, in imitation of St Sophia at Constantinople, and adopted by Charlemagne as the model of his church at Aix la Chapelle, the Basilica of San Giovanni Evangelista, founded in 425 by the Empress Galla Placidia, consisting of three naves, supported by twenty four ancient columns, and surmounted by a quadrangular *campanile*, the church of San Giovanni Battista, founded also by Galla Placidia, the mausoleum of Galla Placidia, containing a massive sarcophagus of Greek marble, in which the ashes of the empress lie, the palace of Theodoric, king of the Ostro-Goths, once a most magnificent structure, but reduced to a mere ruin by Charlemagne, who carried away its ornaments and mosaics, the tomb of Dante, consisting of a sarcophagus of Greek marble, the archbishop's palace and chapel, the town house, the library, containing 70,000 volumes and 700 MSS., the museum, containing a rich cabinet of medals, and the academy of the fine arts. At a distance of 3 miles from the town is the church of San Apollinare in Classe, erected in 534-549, restored in 1779, one of the most imposing basilicas in the north of Italy. The manufactures are almost confined to silk, and are of very little importance. The trade, which was at one time extensive, has greatly fallen off, but the port is still much frequented by the trading barges of the Adriatic. This port was in early times one of the best on the coast, and large enough to contain the fleets of Augustus, but it gradually silted up. The evil has been so far remedied by the Canale Naviglio, which is about 5 miles in length, and gives a direct communication with the sea at Porto Corsini.

Ravenna is said to have been founded by Thesallians (Pelasgians), and afterwards to have come into possession of the Umbrians. It long remained an insignificant place, and its greatness did not begin until Augustus made it one of the two chief stations of the Roman fleet. During the decline of Rome, A.D. 404, Honorius made it the seat of the Western Empire, and by availing himself of its strong natural position, due to the morasses with which it was surrounded, and adding to its fortifications, made it almost secure against any hostile attack. During his reign and the regency of his sister Placidia it was adorned with many of its noblest edifices. Not long after it fell into the hands of Odoacer, who in his turn was expelled by Theodoric, under whom it became the capital of the Goths. After two of his descendants had succeeded it was recaptured by Belisarius, the celebrated general of Justinian, who made it an exarchate, and conferred it on Narses, his favourite lieutenant. This exarchate, after lasting for nearly two centuries, was terminated by Astolphus, king of the Lombards, who, having captured the city, made it the metropolis of the Longobardic Kingdom in 752. Pepin and Charlemagne, having succeeded in expelling the Lombards, made a present of Ravenna and its exarchate to the pope, with whom, though not without occasional interruptions, it remained till 1860. Under the walls of Ravenna, in 1512, the united armies of Louis XII of France and the Duke of Ferrara gained a victory over the Spanish and Papal troops, but paid dearly for it, as they lost their brave young commander, Gaston de Foix, and many of his best captains. Pop. of commune (1901), 63,839.

RAVENSBURG, a town of Württemberg, in a valley on the Schussen, 22 miles E N E of Constance. It is irregularly built, has considerable remains of its old fortifications, old towers, and an old town house. A splendid view of the Lake of Constance, the Alps, &c., is obtained here. Pop. (1895), 12,694.

RAVENSCHROFT, THOMAS, an English musical composer, was born in 1592, educated for his profession in St. Paul's choir, and received the degree of Bachelor of Music from Cambridge, as it is believed, when only in his fifteenth year. In 1611 he published a collection of twenty three part songs, under the title of *Melismata, Musical Phanases*, &c., some of which are of great beauty. In 1614 appeared his *Brief Discourses*, another collection of part songs (twenty in number), prefixed by an essay on the ancient musical modes. In 1621 he published his *Whole Book of Psalms*, containing a tune for each of the 150 psalms, many newly composed, and all harmonized in four parts by Tallis, John Milton (the poet's father), Ravenscroft himself, and other musicians. The composer died about 1635.

RAWAL PINDI, a municipal town and military centre of Hindustan, in the Panjab, capital of the division and district of its own name, between the Indus and the Jhilam, and on the railway from Lahore to Peshawar. It consists of the native town and the cantonments, separated by the small river Leh, and is quite a modern place, with wide, hand some, and well-kept streets, having rapidly increased in recent years. There is a strong fort, within which is an arsenal, and there are a number of good public buildings, Anglican and other churches, schools for European boys and girls, normal school, European shops and hotels, public gardens and large public park, good bazaar with memorial archway attached, and a handsome and spacious market. A considerable part of the trade with Cashmere passes through Rawal Pindi, which also trades in grain, and has an annual horse fair. There are no manufactures of importance. Pop. (1881), 52,975, (1891), 73,460.

VOL. XII.

RAWITSCH, a town in Prussia, in the government and 55 miles south of Posen. It is tolerably well built, and carries on manufacturing industries of some importance. Pop. (1895), 12,362.

RAWMARSH, a town of England, in the W Riding of Yorkshire, 12 miles south-west of Doncaster, with ironworks, steel-rolling mills, and collieries. Pop. (1891), 11,983, (1901), 14,537.

RAWTENSTALL, a municipal borough of England, in Lancashire, 18 miles north of Manchester. It consists of regular and well built streets, with handsome places of worship and schools, public park, technical school, theatre, cemetery, &c. It is a centre of the cotton, woollen, and slipper manufactures. The town was incorporated in 1891. Pop. (1891), 29,507, (1901), 31,052.

RAY, a single line of light. See OPTICS.

RAY (*Raja*), a group of fishes of the order of Elasmobranchii, including several genera and many species. The Skates and the Rays are nearly allied to each other, and together form the group Batidae. These fishes are recognized by their broad flattened bodies, which are generally of a rhomboidal shape, and consist in greater part of the enormously developed pectoral or breast fins, which are supported upon a modified portion of the anterior skeleton. These fins are not free and separate, but appear as if united to, and as if forming part of the body itself. The body in these fishes is therefore truly broad and flattened from above downwards, so as to present a broad back and belly. Such, however, is not the case with the Flounders, Turbot, and other fishes of the family Pleuronectidae, the characters of which are explained in the article of that name. On the upper surface of the disc-like body, the eyes are borne, together with spiracles or apertures, by which water may be admitted to the gill sacs. The mouth, nostrils, and gill openings (five on each side) exist in the lower surface of the body. The tail is elongated and slender, and is generally armed with sharp spinous processes. Two or more dorsal fins may exist, whilst the caudal or tail fin is of the heterocercal or unequally lobed conformation. The scales are of the placoid (which see) variety. The mouth is generally furnished with broad flat teeth of rhomboidal shape, and is of small size. These fishes are oviparous, and produce eggs, which are inclosed in cartilaginous capsules resembling sea weed in texture, frequently cast up on the sea shore, and known familiarly as 'mermaids' purses,' and as 'sea purses,' &c. Occasionally the Rays may attain very large dimensions, and correspondingly immense weights. They are bottom fishes, inhabiting the lower strata of water, and feeding upon other small fishes, Crustacea and Mollusca. They swim chiefly by peculiar undulating motions of the edges of the pectoral fins.

In the true Rays (*Rajina*) the snout is more or less pointed and prolonged, and two dorsal fins exist near the end of the tail. The most common members of this group are the Thornback (*Raja clavata*), so named from the curved spines which arm the back and tail, two spines existing above and two below the muzzle. Each side of the tail possesses a row of shorter spines. The colour is brown, with whitish spots on the upper surface. Two dorsal fins, and a caudal or tail fin exist. The White Ray (*Raja batra*) possesses an acutely-pointed muzzle, the body being somewhat lozenge-shaped. The head is slightly raised or elevated above the flattened body. The colour is ashy-gray above, and white, with rows of black spots, on the under parts. The tail is elongated, and possesses hooked spines along its ridge. The Sharp nosed Ray (*R. oxyrinchus*) is stated to be a favourite French food fish, the Homely Ray (*R. maculata*) being another species frequently sold in the London

markets The females of these fishes are popularly known as *moids* Other common species of the genus *Raja* are the *Raja marginata*, or Bordered Ray, the *R. spinosa*, or Sandy Ray, *R. fullonica*, or Shagreen Ray, and the rarer *R. radata*, or Starry Ray

The family *Trygonidae* includes the Sting Rays or Firefishes, of which the *Trygon pastinaca* or common Sting Ray is a familiar example This species occurs in the Mediterranean Sea, but is also found on the British coasts. The head is indistinct in these Rays, and is inclosed by the pectoral fins The tail is armed with a long spine, the edges of which are denticulated or serrate No dorsal fin exists The teeth are of small size The spine may inflict a severe wound, and a second spine may replace the first when worn or injured The animal uses the tail and spine as a means of defence The flesh is unpalatable

The Horned Rays (*Cephaloptera*) are distinguished by the head being abrupt or truncate, and by the membrane at the sides projecting beyond the head in the form of two horn like folds The eyes are large, and are placed laterally The tail has a long barbed spine, as in *Trygon*, and the jaws are provided with numerous small teeth *Cephaloptera Giorna*, common in the Mediterranean Sea, attains occasionally a large size (Risso enumerating a male weighing 800 lbs, and a female of 1200 lbs weight), and the general size of these fishes considerably exceeds that of other species of Rays Various other species of this genus are known

The Eagle Rays (*Myliobatidae*) possess projecting heads, with the pectoral fins extended laterally in a great degree so as to imitate wings The teeth are hexagonal, flat, and pavement like The slender tail possesses one dorsal fin, and is armed, as in preceding cases, with a notched spine *Myliobatis aquila* is a familiar species These Rays are sometimes known as 'Mullens' and as 'Whip tails,' from the slender, lash-like conformation of their tails The Common Eagle Ray occurs in the Mediterranean Sea, and is dreaded by the fishermen on account of its spiny tail, which they cut off as soon as the fish is captured

The Beaked Rays (*Rhinobatidae*) form another group, sometimes included with the already enumerated genera, and distinguished by the prominent or beaked character of the head and muzzle The mouth is undulating, and the teeth are rounded or elliptical The body is smooth

The *Torpedoes* or Electric Rays are described under the head of *TORPEDO*

RAY (or as he at one time spelled it, WRAY), JOHN, a celebrated naturalist, was born at Black-Notley, near Braintree, in the county of Essex, 29th November, 1627 His father, Roger Ray, a blacksmith, determined to give the son a good education, and he was first sent to the grammar school of Braintree, then to Catharine Hall, Cambridge, and afterwards to Trinity College in that university There, in company with Isaac Barrow, he attained the honour of a minor fellowship in 1649, being chosen major fellow when he took the degree of M.A. In 1651 he was appointed Greek lecturer to his college, in 1653 mathematical lecturer, in 1655 humanity reader, in 1660 he was ordained deacon and priest, but never held any church preferment nor performed any regular parochial duty, and two years later resigned his fellowship rather than sign the Act of Uniformity Accompanied by his friend and former pupil, Francis Willughby, he travelled over the greater part of the British Islands, collecting and investigating botanical specimens In 1663 the two friends embarked for the Continent, where they remained for three years, travelling through the Low Countries, Germany, Italy, Switzerland, and

France on a scientific expedition, Ray attending to Botany, and Willughby to zoology In 1667 Ray was elected a fellow of the Royal Society, the Transactions of which he enriched with several valuable papers In 1672 he lost his friend Willughby, with whom he had lived ever since he left the university, and who left him the guardianship of his two sons and a legacy of £60 a year Ray carefully superintended the education of his young wards, the younger of whom subsequently became Lord Middleton After several changes of residence Ray finally settled down at his native place, Black-Notley, where he died 17th January, 1705 He left behind him many works, among which the botanical and zoological occupy a prominent part in the history and literature of those sciences His classification of plants, though neglected by his immediate successors, was eagerly adopted by Jussieu and others, under whose hands it formed the basis of what is now known as the 'natural system' of classification Respecting his works on zoology Cuvier writes 'They may be considered as the foundation of modern zoology, for naturalists are compelled to consult them every instant for the purpose of clearing up the difficulties which they meet with in the works of Linnæus and his copyists The particular distinction in his labours consists in an arrangement more clear, more determinate than those of any of his predecessors, and applied with more consistency and precision His distribution of the classes of quadrupeds and birds has been followed by the English naturalists almost to our own days, and we find manifest traces of that he has adopted as to the latter class in Linnæus, Brisson, Buffon, and all other ornithologists.' This is rather too high praise, however Swanson in his Discourse on the Study of Natural History says that 'all the honour that has been given to Ray, so far as concerns systematic zoology, belongs exclusively to Willughby He alone is the author of that system which both Ray and Linnæus took for their guide, which was not improved by the former or confessed by the latter

The system of Ray, in his Synopses, is almost precisely a transcript from that of Willughby, and it is not one of the least beauties in the character of the survivor, that so far from wishing to appropriate to himself the laurels of his deceased patron, he seems particularly anxious to disclaim all pretensions to them 'The Dictionnaire d'Ichthyologie, by Daubenton and Hail, in the Encyclopédie Méthodique, consists, as we learn from Cuvier, in a great measure of translations from Ray's works on fishes We append a list of his most important scientific works *Methodus Plantarum Nova* (London, 1682, 12mo, second edition, improved and augmented, 1703, 8vo), in which he lays down the principles of his classification of plants, *Historia Plantarum Generalis* (three vols folio, 1686-1704), *Synopsis Methodica Animalium Quadrupedum et Serpentinum Generis Vulgarium* (1693, 8vo), *Historia Insectorum* (1710, 4to); *Synopsis Methodica Avium et Piscium* (1713, 8vo), the *Ornithologia* of Willughby, arranged and translated (1676, three vols.), also an edition of his friend's *Historia Piscium* (1686, two vols folio) Besides his numerous scientific writings, Ray published several works on divinity and other subjects, the best known of which are *The Wisdom of God manifested in the Works of the Creation* (1691, 8vo), a work which has run through many editions, and to which Paley is deeply indebted, *Three Phynco-Theological Discourses concerning the Primitive Chaos and Creation, the General Deluge, and the Dissolution of the World* (1693, 8vo), *Collection of English Proverbs* (1670, 8vo) See *Memorials of John Ray* (1846) and *Correspondence of John Ray* (1848), edited by Dr Lankester for the Ray Society

RAYNAL, GUILLAUME THOMAS FRANÇOIS, a French writer, was born at St Geniez (Aveyron) on April 12, 1713, and at an early age entered the society of the Jesuits. He distinguished himself by his eloquence as a preacher, but in 1747 quitted the society and went to Paris. Here he gained a subsistence by his pen, but his first works, *Histoire du Stathouderat* and the *Histoire du Parlement d'Angleterre*, attracted little notice. He was for some time editor of the *Mercur de France*, a position which brought him both fortune and reputation. His *Histoire Philosophique des Etablissements et du Commerce des Europeens dans les deux Indes* (1770) gained him reputation, although he was himself so sensible of its errors and defects that he took a journey through France, England, and Holland to obtain information, and the new edition (1781) was much improved. His free expressions on arbitrary power, priestcraft and superstition caused his banishment by the parliament and the condemnation of his book by the Sorbonne. After residing in Germany and Switzerland he finally received permission to return to France, but not to Paris. In the early part of the revolution Raynal, who was not favourably disposed to the democratic principles of the day, was in a critical situation, but after the fall of the Jacobins his condition was somewhat improved. He died at Chaillot near Paris, on Mar 6, 1796. The *Histoire Philosophique* (new edition, Paris, 1820) was the most celebrated of his works, but is now little esteemed. Raynal also wrote *Anecdotes Historiques, Militaires et Politiques de l'Europe* (1753), *Histoire du Divorce de Henri VIII et de Catherine d'Aragon* (1763), *Revolutions des Colonies Anglaises de l'Amérique Septentrionale* (1781), and *Histoire Philosophique et Politique des Etablissements et du Commerce des Europeens dans l'Afrique Septentrionale* (1826), the last doubtfully authentic.

RAYNOUARD, FRANÇOIS JUSTE MARIE, a French poet and philologist, born at Brignoles in the department of Var, 8th September 1761. He studied for the bar at Aix, but his strong literary tastes induced him to try his fortune as an author in Paris. Meeting with less encouragement than he anticipated, he soon returned south and engaged in the practice of the law at Draguignan with great success. Elected a deputy to the Legislative Assembly in 1791, he attached himself to the Girondins, and on the proscription of that party was thrown into prison. The fall of Robespierre set him at liberty and after a second unsuccessful attempt at living by his pen in the capital, he again resumed his profession of advocate in his native province, and in a short time acquired, by his eloquence and talent, a respectable fortune. He was now in a position to court literary fame in safety, and he once more settled in Paris. His first work of any interest is his *Société dans le Temple d'Aglaure* (Paris, 1802), a poem which obtained a prize from the Institute. This was followed by two tragedies, *Éléonore de Bavière* and *Les Templiers*, the latter being performed at the Théâtre Français in 1805 by the special order of Napoleon. In 1806 he was elected a member of the Corps Législatif, and so high was the emperor's opinion of Raynouard's capabilities that he would have been raised to the presidency had he shown less of the fearless independence of spirit which characterized him. During the Hundred Days he steadfastly refused the tempting offices offered him by Carnot. In 1817 he was nominated perpetual secretary of the Academy, a post he resigned in 1826, when the ministry presented to the chambers a bill which had for its object the limiting of the liberty of the press. Though deeply engaged and interested

in the political movements of his time, he still devoted a share of his attention to literature. Besides the tragedies above mentioned he wrote several others, among which we may mention *Les États de Blois*, *Scipion*, *Don Carlos*, *Delora*, *Charles I*, *Jeanne D'Arc à Orléans*, none of which were represented upon the stage. He therefore renounced the drama, and devoted himself to the study of philology, restricting himself more particularly, however, to Provençal language and literature. The result of these studies he gave to the world in his *Grammaire Comparée des Langues de l'Europe Latine dans leurs Rapports avec la Langue des Troubadours* (1821, 8vo), *Choix des Poésies originales des Troubadours* (1816-21), six vols 8vo), *Lexique Roman*, ou *Dictionnaire de la Langue des Troubadours comparée aux autres Langues de l'Europe Latine* (1836 44, six vols 8vo), *Observations Philologiques sur le Roman de Rou, et sur quelques Règles de la Langue des Trouveres au XII^e Siècle* (Rouen, 1829 8vo) together with other works of great value on like subjects. Raynouard died at Pissy, near Paris, 17th October, 1836.

RAZOR, the well known keen edged instrument for shaving off the beard or hair. Razors seem to have been in use at a very early period of the world's history. They were used by the ancient Egyptians. The Levitical code expressly forbade the shaving of the beard and many Jews in some countries remove all superfluous hair with the scissors until this day. It is believed by many authorities that the primitive shaving instruments were made of sharpened flints, the savages of Polynesia still use two pieces of flint of the same size, or pieces of shells or sharks' teeth ground to a fine edge for this purpose. Among civilized nations the blade is metal, usually steel, the finest cast steel being preferred. The handles are made of a great variety of materials, as silver, ivory, tortoise shell, bone, horn &c. The Chinese and Japanese razors are very rarely furnished with handles. (For the manufacture see CUTLERY.) The great centre of razor manufacture is Sheffield, and from this place razors of all qualities and prices are sent to every quarter of the globe. To such a degree of perfection has their manufacture been carried, by the division of labour and the aid of machinery, that makers can supply razors of first rate quality to the army at 4½d each. To keep a proper shaving edge on razors, they must be frequently applied to the razor-strop which is usually a piece of wood about 1½ inch broad and 12 inches long covered on each side with leather. The surface of one of the pieces of leather is coated with a paste which may consist of emery reduced to a fine powder, 4 parts, deer suet, 1 part, well mixed together, or of powdered Turkey stone, 4 oz, jeweller's rouge, 1 oz, prepared putty powder, 1 oz, and hard suet, 2 oz. The leather on the other side of the strop is left in its natural state, and upon it the sharpening is generally finished. A fine smooth surface of calf skin, with the grained or hair side outwards, is best. The keenness of the edge may be further increased by dipping the razor for a short time in hot water.

RAZOR BILL Sec Atk

RAZOR SHELL (*Solen*), a genus of Lamellibranchiate Mollusca, forming the type of the family Solenidae, which is included in the section Sinu-pallialia (see LAMELLIBRANCHIATA and MOLLUSCA) of the above class. In this section large breathing-tubes or siphons exist, and the pallial or mantle line is indented. The Razor shells are common on British sea coasts, and are recognized by their excessively broad development, the ordinary shell being thus greatly elongated from side to side. The shells are sub-cylindrical in shape, and of straight or slightly curved form. The shell gapes at either end, the

hinge-teeth number two on each valve, and the ligament for opening the shells is long and external in position. The mantle is open in front, to give exit to the powerful muscular 'foot', used by these molluscs for burrowing swiftly into the sandy shores which they inhabit. These molluscs generally appear with the tip of the shell showing above the burrow. By means of their siphons water is introduced for aerating the blood, as well as for the conveyance of nutriment. On the slightest alarm they burrow so quickly and deeply into the sand that to try to excavate them is an almost hopeless proceeding. The familiar species are the *Solen siliqua*, *S. ensis*, *S. vagina*, *S. marginatus*, and *S. pellucidus*.

RAZZI, or RAGGI, GIOVANNI ANTONIO, surnamed *Sodoma*, was born in 1479, according to some in a village of Siena, or according to others at Vercelli in Piedmont, and is admitted on all hands to be one of the most distinguished painters of the Siena school. He worked in the Vatican under Julius II and Leo X, the latter of whom made him a knight. He died in the great hospital at Siena in 1554. The finest of his paintings are there, among others a Christ Bound, a faint St Catherine, and a Descent from the Cross. His principal scholars were Baccafumi, Neroni, and Ricciarelli.

RÉ, or RHÉ, ÎLE DE, an island of France, in the Bay of Biscay, about 2 miles off the coast of department Charante Inférieure, 6 miles west of Rochelle, but hid from the town by the headland of Chef de Baie, greatest length, WNW to ESE, 18 miles, breadth very irregular, being little more than 1 mile near the central part, where it forms a kind of isthmus, and nearly 4 miles on either side of it, area, 18,250 acres. The coasts on the south and west are lofty and precipitous, but much indented on the north, where there are several good havens, particularly those of the villages of Ars, La Flotte, and the small town of St Martin. The last is defended by a citadel of considerable strength, and there are three other forts on different parts of the island. The soil is not fertile, scarcely producing either corn or pasture, but the vine thrives well, and is cultivated to some extent. A considerable extent of surface is occupied by salt marshes, from which much salt is made. This manufacture and fishing form the chief employments. There are also several distilleries of brandy. In 1627 an English force under the Duke of Buckingham made an unsuccessful attempt on this island, in order to relieve the Protestants besieged in Rochelle. Pop (1896), 14,601.

READE, CHARLES, the eminent English novelist and play writer, was the son of Mr John Reade of Ipsden House, in Oxfordshire, where he was born 8th June, 1814. He was educated at Magdalen College, Oxford, where he took the B.A. degree in 1835. He was called to the bar in 1843, but, finding literature more attractive than law, he devoted himself to the former, and never actively pursued the latter. He became first known by his novel of *Peg Woffington* (1852), which he afterwards dramatized in conjunction with Tom Taylor under the title of *Masks and Faces*. This was followed by *Christie Johnstone* (1853), in which he showed considerable appreciation of certain characteristics of Scottish life. The appearance in 1856 of *Never Too Late to Mend*, one of his 'novels with a purpose', in which he attacked the English prison system with, perhaps, greater zeal than unbiased judgment, secured for him a great reputation. His next great work, the most scholarly and artistic of his writings, *The Cloister and The Hearth*, dealing with the lives of the parents of Erasmus, appeared in 1861, and is decidedly his masterpiece, though it has not attained the popularity, with the general reader, of some of his more

melodramatic novels. Among the more important of his other works are —*The Course of True Love* never did run Smooth, *Love Me Little Love Me Long*, *White Lies*, *Hard Cash*, *Griffith Gaunt*, *Foul Play* (in co operation with Dion Boucault), *Put Yourself in His Place*, *A Terrible Temptation*, *The Wandering Heir*, *Singleheart and Doubleface*, *A Perilous Secret*, &c. He is also the author, either alone or in collaboration with others, of the following dramas —*Gold, Two Loves and a Life*, *The King's Rivals*, and *Drink*, the last adapted from Zola's *L'Assommoir*. He died 11th April, 1884. Reade was enthusiastic by nature, and was continually being filled with new enthusiasms towards any cause which happened to rouse his easily-excited interest. The abuses in the convict prison system produced, as we have said, one of his best known novels, the system of private lunatic asylums furnished the motive for *Hard Cash*, as the trades union outrages at Sheffield did for *Put Yourself in His Place*, while in *Foul Play* he attacked the alleged practice of overloading and overinsuring ships. His writings show considerable skill in the delineation of character, much narrative, descriptive, and dramatic power, combined at times with coarseness and theatricality.

READING, a municipal, parl, and county borough of England, capital of the county of Berks, intersected by two branches of the Kennet, near its confluence with the Thames, 36 miles west by south of London. The town is well laid out, has four public parks, and has rapidly improved within recent years. It has several interesting churches, one of them, St Lawrence's, with a tower 189 feet high, various other places of worship, handsome municipal buildings, an imposing castellated county jail, remains of a magnificent abbey (including a fine restored gateway), founded by Henry I, who, with his queen and eldest son, is supposed to have been buried here, an assize hall, the Royal Berkshire hospital, public hall, a fine edifice with a suite of apartments for the free library, reading rooms, and museum, a small theatre, an excellent endowed grammar school, founded in 1486, a blue coat school for boys, a green coat school for girls, &c. There is a municipal service of electric tramways. The industrial establishments include the biscuit factory of Huntley and Palmer, a large nursery establishment, a sauce work, iron foundries, breweries, corn-mills, &c. Reading is the centre of a large and fertile agricultural district, and has an extensive trade. The Kennet is navigable for barges, and there are suitable wharfs. The borough sends one member to Parliament, having lost one by the act of 1885. Pop of parl bor in 1881, 46,054, in 1891, 55,666, municipal bor (1891), 60,054, in 1901, parl bor 65,468, co bor 72,214.

READING, a city of the United States, Berks county, Pennsylvania, beautifully situated in a large basin at the foot of lofty hills, on the left bank of the Schuylkill, 52 miles north west of Philadelphia, with which it is connected by several lines of railways. It consists of spacious streets and a handsome central square, is built substantially and with great regularity, and has numerous churches, some of them handsome structures with lofty spires, and an imposing court house with a pillared portico. The chief industrial works are forges, foundries, rolling mills, and other works connected with iron and steel. It is a place of active trade, and is the market for a rich and populous agricultural district. It was laid out in 1748, incorporated as a borough in 1788, and as a city in 1847. Pop (1880), 43,280, 1890, 58,661, (1900), 78,961.

REAL (in philosophy), opposed to *ideal*, is applied

to that which exists independently of our ideas or imagination. Hence *realism* is the opposite of *idealism*, and is that philosophical system which conceives external things to exist independently of our conceptions of them. Realism is divided into different systems, of which that of Spinoza is one of the most important. He supposes one original reality, and teaches that all other things (substances) are but modifications of this one real being, which he conceives to be the Deity. Realism becomes materialism if it considers matter or physical substance as the only original cause of things, and the soul itself as a material substance. Realism is found also in dualism. In the scholastic philosophy realism was opposed to nominalism, and in modern literary and artistic criticism it denotes certain tendencies opposed to those of the romanticist and other schools. See DUALISM and IDEALISM.

REAL, a term used in law. *Real property* or *realty* is commonly said to consist in lands, tenements, and hereditaments, *personal property* or *personalty* comprehends all the other kinds of property, such as goods and chattels, money, &c. Real property is subdivided into *corporeal* and *incorporeal* property, the former term denoting land with its visible adjuncts, recognized by law as pertaining to it, consisting chiefly of things growing, erected, or fixed thereon, and the latter term including advowsons, rights of way and common, offices, dignities, franchises, rents, and so on. Real property of every description is now (with the exception of copyhold) generally transferred by deed, and not as formerly by the delivery of possession accompanied by various solemnities. In the Roman law property was divided into movable and immovable, in Scotch law the division is into heritable and movable. Mortgages and securities for money affecting lands or real estate in England, and bonds of all kinds, are personal property, and go to the personal representative, while in Scotland all securities for money affecting lands or heritable property are themselves heritable, and descend to the heir.

REAL, a former Spanish silver coin and money of account, equal to about $2\frac{1}{4}$ d sterling. Of current Spanish coins the nearest in value to the real is the 20 centimo silver piece.

REALGAR, native red disulphide of arsenic (As_2S_3). See ARSENIC.

REALISM. See **REAL** (in philosophy).

REALISTS. See **NOMINALISTS**.

REAL PRESENCE. See **LORD'S SUPPER**.

REAL SCHOOLS (German, *Realschulen*) are those educational institutions of Germany having for their special object the teaching of such branches of knowledge as are most useful in everyday life, as science and art, the modern languages, &c., in contradistinction to the grammar schools and gymnasia, in which the classical languages, and in a lesser degree mathematics, are taught. By the law of 1859 the Prussian real schools must be, before all, German and Christian, the national language, literature, and religion receiving special attention, the study of Latin in schools of the highest class is also compulsory, but has not the same time devoted to it as those branches closely connected with daily life. Under the system introduced in Prussia in 1882 the following grades of real schools are recognized. Real Gymnasia (*Realgymnasien*), with a nine years' course, including Latin, Upper Real Schools (*Oberrealschulen*), with a nine years' course, not including Latin, Real Progymnasia (*Realprogymnasien*), like real gymnasia, but without the highest class, Real Schools proper, with a seven years' course and no Latin, and higher middle schools (*Bürger schulen*), with a six years' course.

REAM, a quantity of paper, consisting generally of 20 quires of 24 sheets each. The printer's ream consists of $21\frac{1}{2}$ quires, or 516 folio sheets.

REAPING HOOK, or **SICKLE**, a curved metal blade with a cutting edge on the inner side of the crescent, and set in a wooden handle, used for cutting down corn, grass, &c. It is about 18 inches in length, and tapers from a breadth of about 2 inches at the handle down to a more or less sharp point. The edge is sometimes toothed like a saw, but is now, in most cases, smooth, like a knife. The reaper grasps a handful of corn in his left hand, and with the reaping hook cuts the stalks of the corn as close to the ground as possible. The sickle is seldom used now, adays where the scythe and the reaping machine can work. The sickles used by the ancient Egyptians, Jews, and the Chinese seem to have had much the same shape as those of the present day.

REAPING MACHINES. Till very recently the process of reaping corn differed little from that which had been pursued from the remotest ages of antiquity. The sickle formed the main implement used in harvesting the various descriptions of grain, and the only modification of this practice which obtained was the employment of the scythe in its room. With the progress of improvement in agriculture as in other arts, the idea suggested itself of cutting down crops by means of a machine, and thus effecting a great saving both of time and expense. About the first invented reaping machine in connection with which horse power was introduced was that devised by the Rev. Mr. Bell of Carmylie, Forfarshire, which received a premium from the Highland and Agricultural Society of Scotland in 1829. This machine, with the power of a single horse, cut a swath of 5 feet at the rate of an acre per hour. It had a square frame on two wheels which ran loose on the axle, except when clutched thereto to give motion to the cutters. The cutter bar in front had fixed triangular cutters, between each of which was a movable vibratory cutter, which made a shear cut against the edges of the stationary cutter on each side. It had a reel with twelve vanes to press the grain towards the cutters, and cause it to fall upon an endless web of cloth, which, revolving to one side by means of rollers, deposited the corn regularly on the ground, where it was collected by the binders and made up into sheaves. These machines at first attracted but little attention, partly because they were imperfectly constructed, partly because, from the great influx of Irish reapers, manual labour was abundant and cheap, and finally, because, owing to the imperfect system of drainage, the land was everywhere laid out in a series of high ridges and deep furrows, presenting a surface peculiarly unfavourable for the successful working of a reaping machine. In the Great Exhibition year of 1851, however, the advantages of machine reaping were brought prominently before the agricultural community by two American machines exhibited in London, the first a self delivery machine by McCormick of Virginia (subsequently much improved by Burgess and Key of Brentford, Essex, and others), and the second, a manual delivery machine by Hussey of Maryland (afterwards greatly modified by Garrett, Crosskill, and others). The former machine presents only one set of blades to the corn, so that no clipping takes place, the grain being, instead, drawn forward to the machine by an apparatus of revolving bars, and there cut at the root by an oscillating, straight, horizontal edge, which acts as a saw upon the several parcels of standing corn included between the projecting teeth. The cut corn is received on a platform, from which it is raked off in quantities suitable for binding into sheaves by a rake that works automati-

cally The motion given to the rake is such that during one part of the revolution of the gathering reel the rake acts as one of the vanes of the reel in gathering the crop towards the cutting-blades, and so that when the rake has been brought into a line with the cutting blades in front of the platform it ceases to revolve round the reel shaft, and is then made to move horizontally upon a vertical hinge above one end of it, by which means it pushes the cut corn off the platform at one side Motion is then given to the rake, so as to cause it to rotate round the shaft of the reel, and so as to bring it into a line with the shaft at that part of its revolution when it again begins to act as one of the vanes of the reel During the intermittent motion of the rake above described the rotary motion of the reel shaft is continuous The mechanism for effecting these motions is mainly as follows —The reel shaft derives its motion from the main carrying wheel of the machine by means of a chain, while the hinge upon which the rake turns is carried by a sleeve casting, through which the reel shaft passes, and in which it is free to turn What is called a *delay motion* is communicated from the reel shaft to the sleeve by means of peculiarly shaped toothed wheels upon and under the reel shaft and upon the sleeve, and thus the hinge of the rake is made to stand upright over the platform at regular intervals, and then to overtake the motion of the reel In order to cause this varying motion of the sleeve and reel shaft to give the required motion to the rake, one side of the rake arm is connected by means of a connecting-rod to an arm projecting from the reel shaft So long as the reel shaft and sleeve both revolve at the same speed (while the rake is acting as one of the vanes of the reel) the rake remains in a position parallel to the shaft of the reel, but when, by the action of the toothed wheels above mentioned, the rotation of the sleeve ceases, the arm of the reel shaft, by means of the connecting rod, presses against the arm of the rake, and causes it to turn upon its hinge So soon, however, as the sleeve again revolves with an accelerated motion, the rake ceases to turn upon its hinge, and gradually resumes the position of one of the vanes The mechanism for driving the delivery apparatus above described was invented and patented by Mr C T Burgess In Hussey's machine no provision is made for throwing off the corn to the ground, but a man sits on the box covering the wheels, and rakes off the corn as it falls cut on the platform, and the horses walk by the side of the standing corn, dragging the machine after them The action of cutting is here effected by a row of blades, drawn to and fro through a series of sheaths or points, which advance into the standing corn, and hold it as it were in separate parcels while it is being subjected to the action of the cutting blades One of the most important of recent additions to the reaping machine is the self binding apparatus, wire or cord being used to bind the sheaves Wire as a binding material was found to be highly objectionable, and in consequence twine has almost completely displaced it in reaping machines The cut grain is carried to a pair of jaws, which hold it till enough has accumulated for a sheaf When this occurs a tripper is relieved and sets the knotter in motion, the bound sheaf being afterwards deposited clear of the machine Besides the numerous self binders there are now elaborate machines called combined harvesters, which combine the reaper and binder with the thresher and other agricultural machines Some of these cut over 120 acres per day, and require for their propulsion a traction engine or about thirty six horses Mowing machines are simply reaping machines adapted for cutting grass One of the first successful types was

that invented by Wheeler in 1853 The development of reaping- and mowing machines has been mainly due to American inventors, and America is still the chief country of their manufacture A self binder costs about £50, a self delivery reaping-machine about £30 or rather less, and a reaper where the sheaves are delivered by hand from about £20 upwards The reaping machine has proved an immense boon to agriculturalists, and it has latterly been introduced into some of the most backward agricultural regions See AGRICULTURE

REASON is a term in mental philosophy which has been employed in a great variety of significations. Dugald Stewart comprises under it all the operations of the intellect upon the materials of knowledge which are supplied in the first place by the senses It distinguishes the true from the false, right from wrong, and enables us to combine means for the attainment of particular ends Hume greatly restricts its functions, withdrawing from its domain the discernment of right or wrong, and of the beautiful and its contrary, and denies, moreover, the certainty of the truth which it enunciates In one place Locke defines reason as the faculty which finds out the means and rightly applies them to discover either the certain agreement or disagreement of two ideas or their probable connection, elsewhere, however, he says that reason is conversant with certainty alone, while the discovery of that which, as probable, enforces a contingent assent or opinion, is ascribed to an especial faculty, called the judgment In the language of the English philosophers the terms reason and understanding are almost identical, and, as we have seen, are so used by Stewart, but in the Kantian philosophy a broad distinction is drawn between them Reason (*Vernunft*) is the principle of principles, it either speculatively verifies every special principle, or practically determines the proper ends of human action The understanding (*Verstand*) is that which conceives of sensible objects under certain general notions, which it again compares one with another, or with particular representations of them, or with the objects themselves It is therefore the faculty of reflection and generalization

REAMUR, RENÉ ANTOINE FERCHAULT DE, a philosophic naturalist, was born in 1683 at La Rochelle, studied under the Jesuits at Poitiers, and afterwards went through a course of law at Bourges. But his tastes led him to the observation of nature, and, having made himself acquainted with the mathematical sciences, he went to Paris in 1703. His relative, the president Henault, introduced him to the savants of the metropolis, and in 1708 he was chosen a member of the Academy of Sciences, to which he had presented some memoirs on geometry For nearly fifty years he continued to be one of its most active members, his labours embracing the arts, natural philosophy, and natural history He was appointed to assist in the *Description des divers Arts et Metiers* published by the Academy, and in executing his part of the undertaking pointed out the way to various improvements by the application of the principles of physics and natural history He made important observations on the formation of pearls, and discovered that the 'turquoises' of Languedoc consisted of the fossil teeth of extinct animals, but among his most useful researches must be reckoned those of which he gave an account in his *Traité sur l'Art de convertir le Fer en Acier, et d'adoucir le Fer fondu* (1722) As a natural philosopher he is principally celebrated for the invention of an improved thermometer, which he made known in 1731 (See THERMOMETER) The fabrication of porcelain also occupied much of his attention, and led him to the discovery of a kind of enamel, called the porcelain of

Méamur, in 1739. His *Mémoires pour servir à l'Histoire des Insectes* place him in the first rank of modern naturalists. He died October 18, 1757.

REBEC, a stringed musical instrument of the violin kind, said to have been introduced by the Moors into Spain. It soon became popular all over the Continent, and in this country, being the favourite instrument of the lower grade of minstrels, and of village musicians, and up till the end of the seventeenth century, playing the same important part at fairs, rustic games and weddings, as does the violin at the present day. It was somewhat larger than the latter instrument, but had only three strings, which were tuned in fifths, and rubbed with a bow. The neck of the rebec terminated in a more or less grotesque representation of a human head.

REBECCAITES, or **REBEKAH'S DAUGHTERS**, a singular association formed in South Wales, in 1839, for the destruction of turnpike gates and toll houses. The rioters were generally dressed in women's clothes, under a leader in the same guise, and made their attacks by night on horseback. The curious appellation by which they designated themselves was derived from the scriptural passage regarding Rebekah—"Let thy seed possess the gate of those who hate them." For a time their success in the repeated demolition of toll bars was so great that the road trustees abandoned the collection of the impost as hopeless, and the Rebeccaites felt emboldened to proceed to greater enterprises, and aimed at a general redress of national grievances. Having marched into Carmarthen on 10th June, 1843, they took possession of the place, and commenced a regular demolition of the toll-houses, workhouse, and similar institutions. In the midst of their devastations a troop of dragoons from Cardiff rode in among them, and striking them with the flats of their swords, soon put them to flight, and took about 100 prisoners. This overthrow proved a death stroke to Rebeccaism, and along with the conciliatory policy of government, which passed in the next session of Parliament an act for the consolidation and amendment of the laws relating to turnpike trusts, gradually restored Wales to a condition of perfect tranquillity.

REBELLION, the taking up arms, whether by natural subjects or others, residing in the country, against a settled government. A foreign state may assist another state to repress a rebellion, without having violated the laws of neutrality. By international law rebellion is considered a crime, and all persons voluntarily abetting it are criminals whether subjects or foreigners. If a foreigner knowingly cruises against the commerce of a state under a rebel commission he takes his chance of being treated as a rebel or as a belligerent. In point of law, his foreign allegiance or citizenship is immaterial, as well as whether the sovereign whose subject he is has recognized the rebels as belligerents or not. It is not the custom for foreign states to interfere to protect their citizens voluntarily aiding a rebellion against a friendly state, if that state makes no discrimination against them. If a foreigner cruises under a rebel commission he may be treated as a pirate, or as a belligerent by his own and all other nations, as well as by the one he is cruising against. If his own country does not recognize the belligerency of the rebels he is, by the law of his country, a pirate, if it does, he is not. In this respect each nation acts independently of others and for itself, and the courts of each nation are governed by the consideration whether their own political authorities have or have not recognized the belligerency. When a rebellion has attained such dimensions and organization as to make of the rebel party a *state de facto*, and its acts reach the dimensions of *war de facto*, and the parent state

is obliged to exercise the powers of war to suppress it, and especially if against neutral interests, it is now the custom of the state to yield to the rebels such belligerent privileges as policy and humanity require, and to treat captives as prisoners of war, &c. Yet this is a matter of internal state policy only, and may be changed at any time.

In Scotch law, by a peculiar fiction, a debtor who disobeyed a charge on letters of horning, to pay or perform in terms of his obligation, was accounted a rebel by reason of his disobedience to the king's command, contained in the writ. The penal consequences formerly attaching to this disobedience, or civil rebellion as it is termed, were abolished by 20 Geo II cap 1.

REBUS, a mode of expressing words or phrases by pictures of objects whose names bear a resemblance to those words, or to the syllables of which they are composed. Many of the ancient coats of arms were rebuses on the names of those who bore them, thus a lock and a heart for the name of Lockhart, an eye and a ton (a barrel) for that of Eytton, &c.

RECAMIER, **JEANNE FRANÇOISE JULIE ADÈ LAIDE**, whose maiden name was Bernard, was born at Lyons, in 1777, and was educated under the charge of an aunt, at the convent of La Déserte. At the age of sixteen she went to Paris, whither her father, a wealthy banker, had now transferred his business. Her extraordinary beauty and talents brought round her shoals of suitors belonging to the world of letters, finance, and politics. In 1793 she was married to Jacques Récamier, a rich banker, more than double her own age. The union was a peculiar one, the lady was incapable of experiencing the transports of passion, as she was of exciting them, and her husband, as we are told in the souvenirs of her adopted daughter, Mme Lenormand, 'n'eut jamais que des rapports paternels avec sa femme.' The whole aim and pleasure of her existence seemed to be to surround herself with hosts of adorers, who were charmed and subdued by her beauty, and that undefinable grace which is so specially characteristic of French queens of society, and which she possessed in perfection. Though she wrote nothing, she, by her confidential intercourse with Chateaubriand and others, exercised no slight influence on French literature. Under the empire she was opposed to Napoleon, as he had placed her father under surveillance for his royalist tendencies. Napoleon took his revenge by refusing to support the bank of her husband during a crisis. It accordingly failed, and Madame Récamier saw herself obliged to quit Paris. She took up her residence with her friend Madame de Staël at Coppet, and afterwards travelled, like her, in foreign countries till the downfall of Napoleon, when she again opened her saloon in the Abbaye aux-Bois at Paris. She died of cholera in 1849.

RECANATI (Latin, *Recanetum*), a town of Italy, in the province of Macerata, and 9 miles north east of the town of that name, on a lofty and commanding eminence. It contains many fine palaces, a cathedral with a Gothic doorway and richly carved roof, several other churches, and a town house. Near it is a splendid aqueduct, communicating with the subterraneous channels which convey water to Loreto. Pop 6408, with port, 10,944.

RECEIPT, an acknowledgment in writing of having received a sum of money in discharge of a debt or demand. In England a receipt is only one mode of proving payment. If the money be paid in presence of witnesses, or even without witnesses, provided a judge or jury believe the statement on oath of the payer, this is quite as good evidence as

if a written receipt were produced. Moreover, a written receipt is not always conclusive, as it is subject to explanation, and if it has been obtained previous to a promised payment which never followed, or by fraud, it will not be taken as a legal discharge. In Scotland, the payment of money cannot be proved by witness where the debt was created by writing, and the validity of a written receipt cannot be challenged, unless in cases of fraud. All written receipts for sums of £2 and upwards must bear a penny receipt stamp impressed on the document or affixed. Where an affixed stamp is used it must be cancelled by the payee writing his name or initials across it in such a manner as to show that the stamp has been used, and so that it may not be again used. Unstamped receipts for £2 and upwards are not admissible as evidence of payment, and persons receiving payment who shall not *bond fide* obliterate the affixed stamp, and those who transfer an obliterated stamp to another document whereon a receipt has been or is intended to be written, are liable in the first instance to a penalty of £10, and in the second to one of £20. Receipt stamps must not only be impressed on or affixed to receipts proper, but also to all notes and memorandums given on payment of money and acknowledging payment of any part of a debt or demand whether signed or not, and on payment of bills of exchange and promissory notes. Stamp duty is not, however, payable on receipts for deposits with bankers, receipts for land tax, income tax, and payments to the crown, for officers', soldiers', or seamen's pay, for purchase of government stock, or those written on the back of duly stamped bills of exchange or promissory notes, or on the back of duly stamped purchase deeds. In the United States receipt stamps are not in use, however large the payment may be.

RECEIVING STOLEN GOODS (or according to the Scotch law term **RECEIPT OF THEFT**) is only a misdemeanor at common law, but later statutes make the offender accessory to the theft, whether this is a felony or a misdemeanor. By 24 and 25 Vict cap xcvi s 9, the receiver of any property feloniously stolen, extorted, or embezzled, is liable to penal servitude from three to fourteen years, or imprisonment for two years, with or without hard labour or solitude. If the stealing is only a misdemeanor, the receiver is subject to penal servitude from three to seven years, or imprisonment for not above two years. In both these cases the receiver may be tried whether or not the thief has been convicted, and the thief may be a witness against him. On information on oath that there is reasonable cause to suspect that goods have been unlawfully obtained, and are concealed, a special warrant may be issued to enter and search any dwelling house or other place by day or night, the parties concealing, or knowingly assisting in concealing, the same may be examined by the magistrate, who is empowered to deliver to the owner goods unlawfully pawned, sold, or exchanged in the possession of any broker or dealer in second hand property, with or without compensation. The police have, in some cases, power to enter in search of stolen goods. Any person who prints or publishes advertisements for the return of stolen goods without questions being asked, or advertisement of like nature, forfeits the sum of £50 to any person who will sue for the same by an action of debt, but no action will be commenced without the sanction of the attorney or solicitor general.

RECENT PERIOD, in geology, is the term applied to the period of time that has elapsed since the creation of man. See the articles **GEOLOGY** and **MAN**.

RECHABITES, a religious order among the

ancient Jews, instituted by Jonadab the son of Rechab. It comprised only the family and posterity of the founder, who was anxious to perpetuate among them the nomadic life, and with this view prescribed to them several rules, the chief of which were—to abstain from wine, from building houses, from sowing seed, and from planting vines. These rules were observed by the Rechabites with great strictness. (See Jer xxxv 6.) In recent times the name has been assumed by a branch of the tea-totalers.

RECIFE. See **PERNAMBUCO**.

RECIPROCITY. See **FREE-TRADE**.

RECITATIVE (Italian, *recitativo*), a species of musical recitation, forming the medium between song and rhetorical declamation, and in which the composer and performer, rejecting the rigorous rules of time, endeavour to imitate the inflections, accents, and emphasis of natural speech. But though the rules of time and rhythm are not to be strictly observed, the recitative is written generally in common time, in order to facilitate the reading. In its approach to speech, therefore, the recitative is mostly syllabic song, that is, each syllable has generally but one tone, and the tones themselves are less prolonged than in song strictly so called. Hence the recitative has not a distinct, developed melody, and a regular modulation, it may, according to the meaning of the words, pass with comparative freedom through the various tones. On the other hand, the tones of the recitative are generally musical tones, of distinct height or depth (we say generally, because in the *recitativo parlante*, in the *opera buffa*, the tones become closely allied to those of speech). When the recitative approaches still more to the strict song, in respect to time and melody, the *arioso* originates. In short, the recitative may be called a *declamation in musical tones*. Such a declamation requires a language between prose and lyric poetry. The recitative consists mostly of narrative and of poetical reflection, but it is capable of passing quickly from subject to subject, serves for dialogue, and to prepare important changes in great musical pieces. For this reason it is introduced in cantatas, operas, and oratorios between the songs, and is, as it were, the prose of music. As the music of recitative is free, so the words need not any artificial rhythm. The recitative includes the simple (by some also called the *parlante*) and the accompanied, or more properly, the *obbligato*. In the simple recitative accompaniment also takes place, but it consists only in simple chords, which are given continuously, or interruptedly. In the *obbligato* recitative the instrumental accompaniment is of more importance, and consists of either sustained chords by the greater portion of the orchestral instruments, or even of florid passages. In the recitative much is left to the singer in respect to time, rhythm, and melody, which requires in him much musical judgment and knowledge of harmony, in order to agree with the *obbligato* accompaniment. The force and beauty of this species of composition depend, in a considerable degree, on the character of the language in which it is used. As that is more or less accented and melodious, the more or less natural and striking will be the recitative. The recitative seems to be much older than the song. Giacomo Peri, Cuccini, and Monteverde, are celebrated as having introduced the modern recitative, and Cesti and Giacomo Carissimi, masters of the Papal chapel in the first half of the seventeenth century, as improvers of the same. (See the article **OPERA**.) Leon da Vinci and Nic. Porpora are said to have first applied the *obbligato* recitative. In the grand and expressive recitative, Gluck and Handel are the chief masters. In the modern opera Mozart and Beethoven are distinguished also in this respect.

RECOGNIZANCE, in law, is an obligation of record which a man enters into before some court of record, or magistrate duly authorized, with particular conditions, as to appear at the assizes or quarter-sessions, to keep the peace, &c. In default, the recognizance is forfeited to the crown, and the party (together with his sureties, if any) may be sued for the sum or sums specified.

RECOIL, the starting backward of a fire-arm after an explosion. This term is particularly applicable to pieces of ordnance, which are always subject to a recoil, according to the sizes and the charges which they contain. It is caused by the pressure of the rapidly expanding gas upon the bottom of the bore in the direction of the axis equal to that which acts upon the projectile, which, being lighter, is thrown to a great distance, while the gun moves backwards generally but a few feet. Various devices have been adopted for receiving the recoil and for utilizing it to bring the gun again into position.

RECOLLET, or **RECOLLECT** (Latin, *recollectus*, gathered together), in ecclesiastical history, the name given to certain reformed bodies of the Franciscan and other orders in the Catholic Church. The reformed society was founded in Spain by Juan de la Puebla y Sotomayor, conde de Belalcázar, in 1484, was admitted into Italy in 1525, and into France in 1595. Thence they spread rapidly into Belgium and Germany. In France, before the revolution, they had 168 houses, forming seven provinces, under the direction of the general of the Cordeliers. The order still exists at Medina Sidonia, Leon, and Pamplona. It is also known as the Friars minor of the strict observance of St. Francis.

RECONNOITRE (from the French) means, in military language, to inform one's self by ocular inspection of the situation of an enemy or the nature of a piece of ground. It is one of the most important departments of the military art, and must precede every considerable movement. A penetrating eye, an acute ear, a calm and sagacious judgment, and much knowledge of military operations, are indispensable for reconnoitering with advantage. This duty devolves upon the quartermaster general's department, and is generally deputed to officers who can produce a rapid map or sketch of the country, showing rivers, hills, valleys, plains, woods, &c. The officer should be well mounted, and accompanied by an escort, well mounted also, in order to escape if observed by the enemy. Reconnoitering not unfrequently brings on engagements, and considerable bodies of troops often march out to cover the reconnoitering party, and to make prisoners if possible, in order to obtain information from them.

RECORD, in law, the authentic testimony in writing, contained in rolls of parchment, of the proceedings and acts of a court of law, upon whose proceedings error will lie. An act of a party which is put on record cannot be varied even in the same term, but a judicial act of the court may be altered during the same term. If a record is lost the court may order a new entry to be made at any time. In order to prove a record, the existence of which has not been disputed on the pleadings, an examined copy is sufficient, should its existence be denied, it must be proved upon inspection of the record itself by the court, this inspection is conclusive not only as to the existence of the record, but as to all its statements, for the record of a court of competent jurisdiction is legally considered as the indisputable proof of all those proceedings having taken place which the record sets forth, and no averment to the contrary in pleading can be sustained. There are also records of the legislature and executive government. All the higher courts, as the three divisions of the High Court,

the county courts, and the courts of borough recorders, file the records in the suits, and are called courts of record. Trial by record means that one of the parties has set up some previous decision of the court, whereupon the other pleads *nul tiel record*—that no such decision or record exists. On this issue is joined, which is tried by the inspection of the records.

RECORDER, a person associated with the mayor and other magistrates of any city or borough, having jurisdiction in a court of record, for their better direction in matters of justice and proceedings according to law. He is appointed by the home secretary, during good behaviour, and must be a barrister of at least five years' standing, his salary is paid out of the city or borough fund. Four times a year, or oftener if he in his discretion shall think fit, or if the crown shall direct, he holds a court of quarter-sessions of the peace, at which he sits as the sole judge, such court being a court of record, and having cognizance of all crimes, offences, and matters whatever cognizable by any court of quarter sessions in the counties. He has no power to make or levy any rate in the nature of a county rate, nor to grant ale or spirit licences, nor can he exercise any of the powers specially vested in the town council by the Municipal Corporations Act. He must not be a member of Parliament, alderman, or police magistrate, but he is not prohibited from practising at the bar, and he is generally a counsel in active practice. In case of his unavoidable absence he is allowed to appoint a deputy, who must also be a barrister of five years' standing. The recorder of London is a justice of Oyer and Terminer, and a justice of the peace of the quorum. He is elected by the lord mayor and aldermen, but by the Local Government Act of 1885 he is not allowed to exercise judicial functions unless appointed by His Majesty to do so.

RECORDER, a musical instrument, formerly popular in Great Britain, resembling a flageolet in shape, with a mouth piece like a bird's beak. The instrument was wider in the lower half than in the upper, its tones were soft and pleasing, and an octave higher than the flute. Milton speaks in his *Paradise Lost* of

'The Dorian mood
Of flutes and soft recorders'

and it is also mentioned by Shakespeare in *Hamlet*.

RECORDS, PUBLIC, are contemporaneous authenticated statements of the acts of the legislature, the executive government, and the courts of record, the term is also popularly applied to all public documents preserved in a recognized repository. The public records are valuable as the evidence of prescriptive and other legal rights, and also as the elucidatory materials of history, and no nation is so rich in these documents as England. With the exception of the notched rods, known as tallies, some of which came down from the Anglo Saxon period, and which were long preserved in the exchequer, the oldest, and in many respects the most important, is the Domesday Book, a survey of land in the greater portion of the English counties, giving lists of estates, their proprietors, value, extent, &c., drawn up by order of William I. Other important territorial surveys are the Rotuli Hundredorum, Extenta Manerii, Testa de Nevill, Pope Nicolas's Taxation, the Domesday of Wales, Henry VIII's Surveys, the Commonwealth Survey, &c. There is also an extensive series belonging to the exchequer, headed by the Great Roll of the Exchequer, otherwise known as the Pipe Roll, or Rotuli Annales, beginning in the second year of the reign of Henry II, and containing an account of the revenues of the crown, the Memoranda and Originalia Rolls, First Fruits and Tenths, certificates of institutions to

livings, records of the Court of Augmentations, instituted to decide questions relating to crown possessions on the dissolution of the monasteries, and Placita, or records of pleadings and judgments. The series of Fines, Concords, Writs of Covenant, &c., consisting of records of the transfer of lands, extends without interruption from the 25 Henry down to William IV (1833), when this species of conveyance was abolished. Other series of great historical value are the Original Acts of Parliament, 12 Henry VII to the present time, Journals of the Lords and Commons, from 1509, Summonses and Returns to Parliament, from 1288 to 1422, and then uninterruptedly from 1542 to the present time, Records of the Courts of Chancery, King's (Queen's) Bench, Common Pleas, from the Norman kings to the present time. Of equal importance are the state papers preserved in the state paper department of the public record office, they consist of the correspondence of the privy-council, secretaries of state, and other public departments, together with miscellaneous domestic papers from Henry VIII to George II, extensive correspondence with foreign powers, and a collection of papers relating to church affairs at and after the Reformation. Attempts have been made by a series of commissions, issued since 1800 at an expense of about £1,000,000 sterling, to digest, arrange, and methodize these enormous collections of documents, formerly scattered in their various inconvenient depositories in the Tower, Chapter House, Augmentation Office, First Fruits Office, Somerset House, and other places, but now for the most part transferred to the Public Record Office in London, and numerous valuable publications have been issued from time to time. By 1 and 2 Vict cap xlix the master of the rolls is made guardian of the public records, with power to appoint a deputy, and in conjunction with the treasury to do all that may be deemed necessary for the custody and control of the national documents. By the regulations of the master of the rolls, issued 5th July, 1858, individuals desirous of consulting the public records, including the state papers, for a literary purpose, have to make written application to the deputy keeper, stating the objects of the search, which, if necessary, may be more fully explained at a personal interview, if the deputy keeper is satisfied with the statement and explanation, a permission is granted to inspect and make extracts without payment of fees. By far the greater number of records are rolls of parchment or vellum, averaging from 9 to 14 inches broad, and about 3 feet in length. Two modes of fastening the documents together were adopted, in the exchequer and common law they are sewed together at the tops in an oblong book form, in the chancery and wardrobe the top of each skin was attached to the bottom of the other. All the great series of the English records, except those of Parliament, are in Latin, the spelling of which is much abbreviated. During the Commonwealth the vernacular was substituted, but a return was made to Latin soon after the Restoration, and the records of the courts were kept in that language down to the reign of George II. Many of the statutes from Edward I to Henry V, and the principal part of the rolls of Parliament, are written in Norman French. In that language petitions to Parliament were framed up till the reign of Richard II, after which time we find English often used in transactions between people and Parliament.

Scotland—The Scotch records, up to the reign of David II, were in the form of rolls, but after that time they were written in the more convenient form of books, the accounts in the exchequer continued, however, to be kept in rolls till 1672. Up to the time of Charles II. the public records were preserved, under the care of the clerk register, in the Laigh

Parliament House (now part of the Advocates' Library). In 1787 they were transferred to the General Register House, where they still remain. The Scotch records include the acts of Parliament and of privy-council, and the records of the various courts of justice, the records of the great seal, privy-seal, and signet, the returns of services, the register of sasines, &c. Many of the more ancient records of Scotland were lost by shipwreck in the reign of Edward I. of England.

Ireland—The early records of this country shared an equally untoward fate, many of them having perished during the wars which led to the final subjugation of the island, and those which survived were frequently mutilated or destroyed on account of insufficient arrangements for their safe keeping. In 1810 a commission was appointed for their preservation and arrangement, whose labours, conducted with considerable success, terminated in 1830. There is no special place for the custody of the Irish records, which are found scattered in various repositories in Dublin. Under the direction of the master of the rolls several volumes of calendars from the patent and close rolls have been published, but the work of editing has not been so satisfactorily accomplished as has that of the English publications of the same nature.

RECOVERY, in English law, the effect of a sentence by which, in a suit instituted for the recovery of an estate claimed by the party, judgment is given that he shall recover it according to his claim. It was an expedient formerly resorted to in order to get rid of the fetters of an entail. A fictitious process was instituted against a tenant in tail, in which the demandant or recoverer obtained judgment for the lands, on a secret confidence that, on the recovery being completed, he would reconvey them to the party in fee simple. The proceedings in these cases were artificial, dilatory, and expensive, and fines and feigned recoveries were accordingly abolished by 3 and 4 William IV cap lxxiv, which enables tenants in tail to make an effectual alienation by any deed to be enrolled in chancery, creates a protector to the estate by requiring that the owner of a beneficial and prior estate for life shall give his concurrence, and provides new methods for barring estates tail. *Recovery of land* is the title used since the passing of the Judicature Acts for the action of ejectment to transfer the possession of land from the wrong to the right owner. See **ENTAIL**.

• **RECRUITING** See **ENLISTMENT**.

RECTOR (a Latin word, signifying a governor), in the Anglican Church, is the clergyman who has the complete and independent charge and care of a parish church. In numerous parishes, however, before the Reformation, the great tithes had been appropriated by religious bodies, who selected from among themselves a vicar to perform the services, and gave him the small tithes as remuneration. The greater tithes thus came to be distinguished as rectorial and the smaller as vicarial, and the term rector was applied to the owner of the great tithes of a parish, whether the parson or any other individual or corporate body. The repair of the chancel of the church falls upon the rector, the parishioners being bound to keep the nave in proper order. The term rector is also applied in some monastic orders to the chief officer of a convent, and again to designate the heads of universities, colleges, academies, schools, and other educational corporate establishments.

RECTUM, the name given to the last portion of the large intestine, which terminates in the anus or vent. This term is applied to this part of the bowel from its comparatively short course, although the term 'straight' (Latin, *rectus*, straight) cannot be

and to strictly describe the rectum, in the human subject at least, the bowel adapting itself to the curves of the sacrum. The rectum enters the pelvis on the left aspect of the sacrum (see PELVIS), and describes a curve corresponding to the concavity of that bone. At its upper part it is loosely attached to the pelvis, and it may make one or two lateral curves before terminating in the anus. More rarely it enters the pelvis on the right, instead of the left side. The muscular fibres of the rectum are distributed equally over its circumference, and do not form restricted bands. In some cases (for example the hinged Brachiopoda) the terminal part of the bowel does not end in any demonstrable anus or vent (see also INTESTINE).

RECUSANTS, in English law, a term used to designate those persons who refused or neglected to attend divine service on Sundays or holidays in the Established Church, or to worship according to its forms. The word is first met with in temporal courts in the first year of Queen Elizabeth, when it was enacted that all persons who, without reasonable excuse, failed to attend some usual place of prayer, should be censured and fined for every offence 12 pence. In 23 Elizabeth the fine was made for every month £20, and later in the same reign it was enacted that if recusants did not submit within three months after conviction they might, upon the requisition of four justices of the peace, be compelled to abjure and renounce the realm, and if they did not depart, or if they returned without due license, they were to be treated as felons, and suffer death without benefit of clergy. In the case of Roman Catholic recusants the laws were more severe. Popish recusants were liable to a forfeit of 100 marks (£66, 13s 4d) for hearing mass, for saying it the fine was doubled, and in both cases they had to undergo a year's imprisonment. They were disabled from taking lands either by descent or purchase after the age of eighteen, unless they renounced their errors, and could not keep or teach schools under pain of perpetual imprisonment. Popish 'recusants convict,' as they were called after a first conviction, could not keep arms in their houses, could not appear within 10 miles of London, could not travel 5 miles from home without license, could not hold any public office, could not have marriage, baptism, or burial performed, except by a minister of the Established Church, could not bring any action at law or equity, all under penalties of fine and imprisonment. By the Toleration Act (1 Wm and Mar cap 18) all persons dissenting from the English Church, except Papists and anti Trinitarians, were allowed to meet for purposes of worship according to their own forms on taking the oaths of allegiance and supremacy. The act was extended to include Unitarians in 1813, and in 1829 the Catholic Emancipation Act granted toleration to Roman Catholics.

RED ADMIRAL BUTTERFLY (*Vanessa Atalanta*), a species of Lepidoptera or Butterflies, the larvae or caterpillars of which are solitary, and feed upon nettles. These larvae are dark or blackish green in colour, with a spotted band of yellow along each side. The butterfly is coloured glossy black on the upper side, the anterior wings possess a red band which runs obliquely from the front margin of the wings across nearly to the hinder angle, at which point the red band curves slightly inwards. Six white markings exist to the outer side of the red band, and external to these latter a bluish streak follows the wing-margin from its anterior surface for a short distance backwards. The posterior wings are bordered broadly behind with red, and black spots are interspersed amid the red colour, whilst two semicircular bluish markings exist at the inner angles

of the latter pair of wings. The under surface is of a general ochre colour, with the characteristic colours of the upper surface.

The Red Admiral Butterfly is common both in England and Scotland. It occurs in continental Europe, in the United States of America, in North Africa. In the East Indies and in the Island of Teneriffe its place is occupied by a nearly allied species, *V. Vulcania*. The Red Admiral appears usually late in September, and it generally disappears about October. (See illustrations at ENTOMOLOGY.)

REDAN, in fortification, is the simplest of all field works, consisting of two parapets of equal length, whose faces join in forming a salient angle, with the apex towards the enemy. They are not of great strength, but as they may be rapidly thrown up, and are of great service in protecting the exposed front of an army, and form an excellent defence to a bridge head, they are frequently employed.

REDBREAST, or **ROBIN REDBREAST** (*Erythacus rubecula*), a species of birds belonging to the Dendroicae Insessores (which see), and included in the sub family of the Erythacinae, or Robins, which in turn generally form a subdivision of the larger family Sylviadae, or Warblers. The Redbreast is perhaps the most popular member of the Robin sub family, and has by its familiar habits endeared itself especially to children, whilst its confidence in man has caused it to be protected and welcomed beyond the generality of its neighbours. The red breast of the male is the distinguishing feature of these well-known birds, the female possessing the breast of a duller yellowish brown colour. As in other Robins, the bill is short, tapering, and somewhat conical in shape, the upper mandible being of convex conformation, and decurved at the tip, which is but slightly notched. The young are of a dull yellowish green colour, and want the characteristic breast colouring of the adult. In Britain the Redbreast, as is well known, is a permanent resident, but in more northern countries it appears to be migratory, flying southwards in winter. It is a permanent bird in all the temperate parts of Europe, and it also occurs in Asia Minor and in North Africa. The nest is made of moss and leaves, and is lined internally with feathers. The eggs number five or six, and are white, spotted with pale brown.

These birds, in winter especially, become very bold and confident in habits, approaching doors and windows without fear, and soon learning even to know the hand which deals out crumbs and scraps of food to them during the inclement season. As Thomson remarks—

Half afraid, he first
Against the window beats, then brusk alights
On the warm hearth then hopping o'er the floor
Eyes all the family askance,
And pecks, and starts, and wonders where he is,
Till, more familiar grown, the table crumbs
Attract his slender feet.

On the approach of the milder spring the Redbreast becomes less familiar, and returns to its native haunts and wilder state. During the breeding season these birds are very pugnacious, and they may attack and drive away all the smaller birds from the vicinity of the nest. The food in spring appears to consist chiefly of insects, whilst in autumn fruits and seeds constitute the dietary. Its delicacy in preparing a worm before partaking of it is somewhat remarkable, it first seizes it by one end in its beak, and beats it on the ground till the inner part comes away, then, taking it in the same manner by the other end, it cleanses the outer part, which is the only portion it eats. The song is sweet, but not specially remarkable, and continues during spring, summer, and autumn.

The Redbreast is also said to sing in the dullest of rainy weather, which silences most other birds. From its general familiarity with mankind it has received a *nom de caresse* in almost every nation in Europe, in Britain it is known as the *Robin Redbreast*, in Germany it is termed *Thomas Gerdet*, and in Norway, *Peter Rønsmed*. See also **ROBIN**.

RED COLOURS. The red mineral colouring matters which are commonly used are red oxide of iron, red oxide of lead, and sulphide of mercury. The different forms of oxide of iron are *Indian red*, which is pure, finely ground hematite, *Venetian red* and *colcothar*, which are coarser forms of the same substance, *minium* or lead oxide, and another form of the same substance containing a little carbonate, and known as *Paris red*, *vermilion* or mercuric sulphide, prepared by sublimation. Besides these pigments the following are also used—*antimony vermilion*, or sulphide of antimony, precipitated by an alkaline hyposulphite, *realgar*, or native sulphide of arsenic, *mercuric iodide*, and various *red lakes*, prepared by precipitating infusions of madder, cochineal, &c. with solutions containing alumina.

RED CORAL. See **CORAL**.

RED DEER. See **DEER**.

REDDITCH, a manufacturing town of England, in the county of Worcester, $12\frac{1}{4}$ miles s s w Birmingham, on an acclivity. It is irregularly but generally well built, amply supplied with water, and has a parish church, a fine Roman Catholic chapel in the Perpendicular style, and other places of worship, a literary and scientific institute, and manufactures of needles, cycles, hooks and eyes, fishing tackle. Pop (1891), 11,295, (1901), 13,493.

REDDLE, RAINDLE, RUDDLE, or RED CHALK, an impure peroxide of iron, having an earthy texture and conchoidal fracture. It is found in many parts of this country, and in Hesse, Silesia, Thuringia, Salzburg, and Upper Lusatia. The English reddle is found chiefly near Rotherham, and is used for polishing lenses, the finest foreign qualities are used for drawings on paper, inferior sorts are used in carpenters' pencils, and the common kind is used for marking sheep.

REDEMPTION, EQUITY of. See **EQUITY of REDEMPTION**.

REDEMPITORISTS, a religious order founded by Liguori at Naples in 1732, approved by Pope Benedict XIV in 1749. Beside the usual monastic vows they bind themselves to labour for the propagation of the Catholic faith by the cure of souls and the education of youth.

REDHILL. See **REIGATE**.

RED OCHRE a name common to a variety of pigments, rather than designating an individual colour, and comprehending Indian red, light red, Venetian red, scarlet ochre, Indian ochre, reddle, bole, and other oxides of iron. As a mineral it designates a soft earthy variety of hematite.

REDON, a town of France, in the department of Ille et Vilaine, on the Vilaine, above the confluence of the Oust, and on the canal from Brest to Nantes, 39 miles s s w of Rennes. The old church of St Sauveur is the chief object of interest. The manufactures include emery, cordage, agricultural machinery, &c. Vessels of considerable size can enter the port at high water. Pop (1896), 5599.

REDONDILLAS signified formerly a species of versification used in the south of Europe, consisting of a union of verses of four, six, and eight syllables, of which generally the first rhymed with the fourth, and the second with the third. At a later period verses of six and eight syllables in general, in Spanish and Portuguese poetry, were called by this name, whether they made perfect rhymes or assonances

only. These became common in the dramatic poetry of Spain.

REDOUBT, in fortification, a small square work without any defence but in front, used in trenches, lines of circumvallation, contravallation, and approach, as also for the lodging of *corps de garde*, and to defend passages. They are usually figures of three, four, five, or six sides, with no re-entering angles, encompassed with a ditch and a bank of earth, which consists of two parts, called *rampart* and *parapet*.

REDPOLE (*Linota*), a genus of Insectivorous Birds belonging to the Coraciiform section of that order, and included in the sub family of the Fringillinae, or True Finches. The Lesser Redpole (*L. linaria*) is the smallest of the British species of this sub-family, and is taken in large numbers in the autumn season by the bird-catchers. It migrates to this country in September, and remains to pass the winter, leaving for the north of Europe in April, for the breeding season. The northern regions of Europe appear to be its chief habitat, whilst the southern English counties are its favourite British localities. The males and females are very fond of each other, and great affection is thus exhibited between the sexes of these birds, which, however, will pair with the nearly-allied linnet (*L. cannabina*), goldfinch, and canary. The song is sweet, but of weak character. The nest is built in bushes or low trees, the eggs being four or five in number, and of a pale bluish-green colour, spotted with orange brown. The bill is short and conical, and the wings slender and pointed. The Mealy Redpole (*L. borealis*) is probably a native of the northern regions, and chiefly of the north of the American continent, but it also occurs in Europe, like the Lesser Redpole, in the winter season.

RED RIVER, a large river of the United States, the southernmost of the great tributaries of the Mississippi, rising in two branches, called the North and South Forks, the former having its source in lat. $35^{\circ} 33' 3''$ N, lon. $101^{\circ} 55' W$, the latter, or principal branch, having its source in lat. $34^{\circ} 42' N$, lon. $103^{\circ} 7' 10'' W$, and uniting near lat. $34^{\circ} 30' N$ and $100^{\circ} W$ lon. The main stream flows S E, forming the boundary between Texas and the Indian Territory, and between Texas and Arkansas, in the latter state it turns south east, and flowing through Louisiana falls into the Mississippi, 125 miles north-west of New Orleans, total course, including the South Fork, is estimated at 2100 miles, of the main stream, about 1200 miles, chief affluents—the Washita, which joins it in Louisiana, and the False Washita, which it receives in the Indian Territory. Much of its course is through rich prairies, with red soil which colours the water. About 100 miles above Nachitoches, which has 100 miles above the mouth of the stream, commences a swampy expansion of the river called the Raft, 70 miles long and 20 miles to 30 miles wide, produced by the river dividing into a number of channels, sometimes shallow, which have been obstructed by fallen trees and other matter brought down by the stream. At great expense this obstruction has been cleared away so far as to admit the passage of steam-boats. About 4 miles above Nachitoches the various channels again unite, soon, however, again to separate into numerous creeks and bayous.

RED RIVER OF THE NORTH, a river of North America, which rises in Elbow Lake, in the west of Minnesota, and after flowing south and south west turns to the north-west and then flows nearly due north, crossing the boundary of the United States into the province of Manitoba, in which it falls into Lake Winnipeg. Its entire length is 665 miles, 525 of which are in the United States.

In Manitoba it receives the Assiniboine, another large stream, at its junction with which stands the town of Winnipeg. There is abundance of fertile prairie land on both sides of the river.

RED RIVER SETTLEMENT, a settlement formed in 1812 by the Earl of Selkirk on the banks of the above river. In 1836 it was repurchased by the Hudson's Bay Company, who formerly held the territory, and in 1869 this company handed over their territorial rights and governing responsibilities to the imperial government who transferred the whole to the Canadian government in 1870, since which time the settlement has formed part of the province of Manitoba. See MANITOBA.

REDRUTH, a market town of England, in the county of Cornwall, in the midst of a rich mining district, $9\frac{1}{2}$ miles north west of Falmouth. It has several churches and chapels, science and art school, market place, several public halls, miners' hospital, &c. The inhabitants are principally employed in the tin and copper mines in the neighbourhood. Redruth is a place of great antiquity. Pop (1891), 10,324, (1901), 10,451.

RED SEA, or **ARABIAN GULF** (ancient, *Mare Rubrum*, *Mare Erythraeum*, or *Sinus Aethiopicus*, Arabic, *Bah-el-Hejaz*, Sea of Hejaz), a branch of the Indian Ocean, communicating with it by the Strait of Bab el-Mandeb, stretching in a N W direction between Arabia on the east, and Abyssinia, Nubia, and Egypt on the west, and only separated from the Mediterranean on the north by the Isthmus of Suez. It forms a very long and comparatively narrow expanse, stretching for 1450 miles, with a breadth which, where widest, as on the tropic of Cancer, does not exceed 200 miles, and in general averages about 180 miles, but diminishes gradually both at its south and north extremities, having at the former, across the strait, a width of only $14\frac{1}{2}$ miles, further subdivided by the island of Perim into two channels, a larger on the east, of 11 miles, and a less on the west, of $1\frac{1}{2}$ mile, and forking at the latter into two branches, the one of which, forming the Gulf of Akaba, penetrates north by east into Arabia for about 100 miles, with an average breadth of about 15 miles, while the other, forming the Gulf of Suez, follows the general direction of the sea, and penetrates between Arabia and Egypt for about 200 miles, with an average breadth of about 20 miles. In the fork between these two branches is the celebrated Mount Sinai, or Jebel Musa (Mount of Moses). The shores, both on the east and west, consist generally of a low tract, mostly sandy, though sometimes swampy, varying in width from 10 to 30 miles, and suddenly terminated by the abutments of a lofty table land of 3000 feet to 6000 feet high. The Red Sea may thus be considered as occupying the bottom of an immense longitudinal valley, which probably at one time extended between the table lands without interruption, but has since been partially filled up by coral-workings, which, extending in parallel lines at a short distance from either coast, have subdivided the sea into three different channels, and have also studded its shores with numerous small islands. In the main channel the depth reaches in one place 1054 fathoms, but diminishes towards the extremities, where the depth in general does not exceed from 40 to 50 fathoms. In the Gulf of Suez, which in earlier times is supposed to have extended considerably farther north, this depth gradually decreases to 30 fathoms, and still continues to shoal, till at the harbour of Suez it amounts to only 3 fathoms, in the Gulf of Akaba, on the contrary, the depth of the main channel is fully maintained, and apparently in some places even exceeded. The currents of the Red Sea are entirely the result of its prevailing

winds. From October to May, when the wind blows generally with great constancy from the south, a strong current sets in from the Strait of Bab-el-Mandeb, and proceeding north accumulates the water so much as to produce a general rise of level of about 2 feet, from May to October, on the contrary, the north wind continues to blow, not without interruption, but with such force and constancy as both to give the current a south direction and carry off the 2 feet of level which had been previously accumulated. These winds, however, proceeding either directly north or south, affect only the main body of the sea, and leave a considerable belt along the coasts subject to alternations of land and sea breezes, and not unfrequently to sudden squalls. The chief dangers to navigation, however, arise not from these, but from the number of shallow reefs, of the presence of which no previous intimation is given, as the sea never breaks upon them. This absence of breakers is attempted to be accounted for by the porous nature of the coral, which offers so little resistance to the sea that it diffuses itself through it without commotion, as if it were passing through a sieve. The principal harbours of the Red Sea are, on the African coast, Suez, Kossair, Suskin, and Massowa, and on the Arabian coast, Jeddah (the port of Mecca), Hodeida, and Mocha. The trade from shore to shore is not of much importance, consisting chiefly of the transport of pilgrims and some grain from Egypt, but the trade up and down the sea, between Europe and the East Indies, has become very large, and has been largely increased by the construction of the great ship canal across the Isthmus of Suez. The communication between Europe and India has likewise been immensely facilitated by the laying in the Red Sea of an electric telegraphic wire, which enters it at Suez, passes thence down to Kossair on its western shore, thence to Suakin on the same side, about lat $19^{\circ}10'N$, and then proceeds in a S E direction close to the island of Perim, and out into the Indian Ocean by the Strait of Bab el-Mandeb, and arrives at Aden. To the biblical student the Red Sea possesses considerable interest, from the account given in Sacred Writ of its miraculous passage by the children of Israel when journeying from the land of Egypt. The place at which they crossed the sea was the Gulf of Suez at its northern extremity, but opinions differ as to the exact point of transit, some maintaining that it was in the neighbourhood of the town of Suez, and others that it was about 18 miles further south, at the mouth of the Wady Tanik.

REDSHANK (*Totanus*), a species of Gallatorial or Wading Birds, allied to the Sandpipers, and included in the genus *Totanus*, which genus, in some systems of classification, is included in a sub family (*Totaninae*) of the family Scolopacidae or Snipes, and which in other arrangements is simply regarded as a genus of the latter family. The genus *Totanus* includes those forms which possess bills of moderate length, the legs being long, slender, and naked above the knee. The three front toes are united by a slight membrane at the base, and the hinder toe is small. The Common Redshank (*Totanus Calidris*) or Gambel is a bird which permanently resides in Britain, whilst it is migratory in North Europe and North Asia, leaving these more northern latitudes on the approach of winter. It occurs in winter more especially in Smyrna and India. Its average length is about 11 or 12 inches, and its popular name is derived from the red colour of the legs. The Spotted Redshank (*T. fuscus*) is an allied species.

REDSTART (*Ruticilla*), a genus of Insectivorous Birds belonging to the Dentirostral section of that order, and nearly allied to the Erythræus or Robins

These birds derive their name from the red colour of the tail, the latter portion of the word being from the Anglo Saxon *steort*, a tail. Two of the Redstarts, one of these the Black Redstart, are only occasional visitors to Britain. The Common Redstart (*Ruticilla phænicea*) is a regular summer visitant, but does not appear to occur in Britain in any great abundance. The female is coloured of a uniform grayish-brown, the male possessing the upper surface of a bluish-gray colour, and having the red tail above alluded to. These birds construct nests chiefly amongst the ivy of ruined buildings, the eggs numbering five or six, and being of a greenish blue colour. The Redstarts are active birds, feeding on fruits, seeds, and insects, which they pursue on the wing. The song is low, but sweet, and these birds are said to imitate very skilfully the notes of other feathered songsters. The Common Redstart also occurs on the Continent. It is very common in France and Italy, and is found periodically in Russia, Sweden, and Norway. The Black Redstart is common in the temperate parts of Europe and Asia.

REDWING (*Turdus iliacus*), a species of Dendr. rostral birds belonging to the Insectorial order, and included in the sub family of the Turdinae, or True Thrushes, in which the bill is of moderate length, the upper mandible being notched at the tip and its ridge curved. The nostrils are placed at the base of the bill, with their openings exposed. The Redwing visits Britain as a migratory bird in winter, migrating from more northern regions. This bird closely resembles the Common Thrush in its plumage, but is of somewhat smaller size. These forms congregate in flocks in winter, and search in the fields for the insects and worms constituting their winter fare. The summer song is pleasing, but the winter notes are harsh and unmusical.

REE, LOUGH, a lake in Ireland, formed by an expansion of the Shannon, between the counties of Longford, Westmeath, and Roscommon, 17 miles long and 1 mile to 6 miles broad, studded with islands, of which Hare Island, Inchhoffin, Inchmore, and several others, are of considerable size. Its outline is remarkably irregular, and formed by innumerable beautiful havens and bays, and its shores are strikingly picturesque. The Inny enters it from the east.

REED. This term is usually applied indiscriminately to all tall broad leaved grasses which grow along the banks of streams, and even to other plants, with similar leaves, growing in such situations. Strictly speaking it belongs to the genus *Arundo*, and especially to the *A. phragmites*, the largest grass of northern climates, and one of the most universally diffused. This grass grows in marshes, often occupying exclusively certain tracts, and attains the height of 8 or 10 feet, with leaves 1 or 2 inches broad, and bears large nodding, silky, purplish brown panicles. It flowers in July. It is used in many countries for various economical purposes, as for thatching, for protecting embankments or sea dikes, for ceilings to cottages, &c., for screens or fences and hotbed covers in gardens, for chair bottoms, for weavers' combs, &c. The flowers afford a green dye, which is occasionally used for colouring woollens.

REED, in music, a thin tongue of wood or metal, which, being set in vibration by the action of wind, gives the sound to certain musical instruments, as the oboe, clarinet, bassoon, the bagpipes, the concertina, accordion, harmonium, and certain stops of the organ. The reed of the oboe and the bassoon consists of two thin wooden tongues (thinnest at the extremity touched by the lips), and fixed into the instrument by a small copper tube, the reed of the clarinet consists of a single wooden tongue, which

vibrates beneath the aperture in the mouth-piece of the instrument, and which is sufficiently large to beat against the sides of the opening. Metal reeds are of two kinds—beating or free. In the first form the reed is larger than the opening through which the wind is to pass, and in pulsating alternately closes and opens it, beating against its margins, in the second the dimensions of the reed are slightly less than the aperture, so that in pulsating, and in consequence of an impulse and its own elasticity, it moves within the current of air, only alternately allowing and interrupting its passage. The beating reed of the organ consists of a circular tube with its face cut away, and a metal tongue placed against the opening and fastened at its upper extremity, the lower being bent outwards a little from the tube to admit the wind. The tube and tongue are placed in an organ pipe, which is stopped in such a manner as to force the wind through the small tube. The pitch of the sound is regulated by the length of the tongue, the quality by the length and form of pipe in which the reed is placed. The pitch of the free reed is determined by the length and thickness of the tongues, which are thickest at the end of the free extremity, and which may be tuned by reducing this thickness if the pitch is too high, or if too low by scraping the fixed end a little thinner.

REED BIRD. See RICE BUNTING.

REEF, a certain portion of a sail comprehended between the top or bottom and a row of eyelet holes generally parallel thereto. The intention of the reef is to reduce the surface of the sail in proportion to the increase of the wind, for which reason there are several reefs parallel to each other in the superior sails, thus the top sails of ships are generally furnished with three reefs, and sometimes four, and there are always three or four reefs parallel to the foot or bottom of the main sails and fore-sails which are extended upon booms. When a reef has to be taken in the sail is slightly lowered, the men climb out along the lower boom or yard, which they lean over, with their feet supported by the foot-ropes, fold the loose portion of the sail round the yard, and tie them up with the cords inserted in the eyelet-holes. As the operation of reefing is dangerous in stormy weather many ships are now fitted up with a patent apparatus by which sails may be reefed from the deck.

Reef also implies a chain of rocks lying near the surface of the water.

REEL, a lively Scotch dance executed by two couples, the music for which is generally written in common time of four crotchets in a bar, but sometimes in jig time of six quavers.

RE ENTRY, in law, a clause usually inserted in leases that upon non payment of rent within a certain period the landlord shall have power to re-enter the premises.

REES, ABRAHAM, a Dissenting clergyman, born in Wales in 1743. Being intended for the ministry he was placed at the Hoxton Academy, where his progress was so rapid that in his nineteenth year he was appointed mathematical tutor to the institution, and soon after resident tutor, in which capacity he continued upwards of twenty-two years. In 1768 he became pastor to the Presbyterian congregation of St Thomas', Southwark (afterwards in Stamford Street), and continued in that situation till 1783, when he accepted an invitation to become minister of a congregation in the Old Jewry, whose spiritual concerns he superintended till his death. On the establishment of the Dissenting seminary at Hackney in 1786 Dr Rees was elected resident tutor in Hebrew and mathematics, which place he held till the dissolution of the academy on the death of Dr Kippis.

In 1776 he was applied to by the proprietors of Ephraim Chambers's *Cyclopædia* to superintend an enlarged edition of that compilation, which, after nine years' incessant labour, he completed in four folio volumes. The success of this work led to a new undertaking, similar in its nature but more comprehensive in its plan, projected and carried on by him under the title of the *New Cyclopædia* (forty-five vols 1802-20, price £85, republished at Philadelphia in forty-seven vols.) Dr Rees obtained the degree of D.D. from the University of Edinburgh. He was also a fellow of the Royal and Linnean Societies. His death took place June 9, 1825.

REEVE, the name given to the female Ruffs (see RUFF), which, with the males, are captured chiefly in the fen counties of England, and after being fed are sent to market, fetching prices which average from 30s. to 2 guineas per dozen.

REEVE (Anglo-Saxon, *gerefa*), the title of an official existing in early times in England. In early England he was the official appointed by the king to carry into execution the judgments of the courts presided over by the ealdorman (earl) and other high dignitaries. In later times there were reeves of various kinds, as the *shire-reeve* (whence our *sheriff*), the town, port, and borough reeve, who were fiscal officers within their respective jurisdictions. The Anglo-Saxon *gerefa* still exists in Scotland under the form *grieve*, a land-steward or farm manager.

REFERENCE See ARBITRATION.

REFINING METALS. For a description of the processes by which the various metals are extracted from their ores, and obtained in a state of purity, see the articles on the several metals.

REFLECTION, one of the principal phenomena exhibited by light. The law of reflection is that the angle of incidence of a ray of light is equal to the angle of reflection. The angle of incidence is the angle which the ray makes with the normal to the reflecting surface at the point where the ray is incident, and the angle of reflection is the angle made by the ray after reflection with the normal.

In fig. 15, plate at OPTICS, it is seen that the ray from a point at the man's feet is reflected at *a* to the man's eye, giving him the image of a point at *i*, and the angle *d a c* is bisected by the perpendicular to the mirror. The image of the man is at a distance behind the mirror equal to his distance from the mirror, and if he moves the image will also move. It is evident that a man 6 feet high can see himself full length in a looking glass 3 feet high. Given the position of a point and that of the reflecting surface, the image of the point is found by drawing a perpendicular to the surface, and producing it on the other side till the produced part is equal to the distance from the surface to the point. If an eye be placed in front of the mirror, and a right line be drawn from the image to the eye, this line will be the direction of the small pencil of reflected rays which gives the image to the eye, and the point where it intersects the mirror is the point at which the pencil is reflected. We may now follow this small pencil from the point to where it is reflected, and then to the eye. (For formulæ and descriptions of spherical mirrors see articles OPTICS and MIRROR.) Smooth surfaces will reflect images, rough surfaces will reflect light, but do not produce images. Sometimes a moderately rough surface, as the surface of paper, when rays from a candle fall upon it very obliquely, will reflect an image of the flame.

Light, reflected from all surfaces except metallic surfaces, is more or less polarized. (See POLARIZED LIGHT.) Heat undergoes reflection at polished surfaces just as light does, and as the surface is roughened the intensity of the reflected heat is lessened.

Sound is reflected, and in consequence of the slowness of its velocity we hear a more or less imperfect echo some time after or before we hear the sound of which the echo is the image. A number of echoes is analogous to a series of images between two looking-glasses.

REFLECTION, TOTAL, is when a ray of light traversing a refracting medium is totally reflected at the surface of the medium, so that it does not issue from it at all. Suppose a ray of light entering air from water. The sine of the angle of incidence is to the sine of the angle of refraction in a constant ratio, as the angle of incidence is increased the ray issues at an angle which increases more rapidly than the angle of incidence, and when the angle of refraction becomes a right angle the ray is totally reflected. The angle of incidence at which total reflection occurs is called the *critical angle*. It differs for different substances, and is known if we know the index of refraction, for it is the angle whose sine is the reciprocal of the index of refraction. The phenomenon of total reflection may be observed in several familiar instances. For example, if a glass of water, with a spoon in it, is held above the level of the eye, the under side of the surface of the water is seen to shine like a brilliant mirror, and the lower part of the spoon is seen reflected in it. Beautiful effects of the same kind may be observed in aquariums.

REFLECTORS, the name generally applied to reflecting telescopes. See TELESCOPE.

REFLEX NERVOUS ACTION, the name applied to one mode of action of the nervous system, which does not necessitate either volition or consciousness. Instances of this mode of action are the sudden (involuntary) start made by some persons on the occurrence of an unexpected noise, the swift closure of the eyelids if some body flies past the head, the contraction of the pupil with an increase of light and the widening of the pupil with the reverse, the rush of saliva into the mouth when some appetizing odour is perceived or some rapid substance is taken into the mouth, the gasping movements of respiration with a sudden dash of cold water on the face or chest, the turning of the head of a sleeping person when the face is tickled, the withdrawal of the leg of a sleeping person if the sole of the foot be tickled, and so on. The mechanism of a reflex action put in its simplest form is as follows:—A sensory nerve is irritated, and an impression is carried along the nerve to a nerve centre, situated in some part of the spinal cord or medulla oblongata, or base of the brain. Changes are thus occasioned in the nerve centre, as a result of which a stimulus is propagated outwards along a motor nerve to a muscle or group of muscles, which are thereby excited to contraction, and movement is effected. This is, in general terms, the explanation of the process to which the phrase 'reflex action' was first applied by Dr Marshall Hall in 1832, though the mode of action was known and described nearly a century earlier. But the phrase is somewhat misleading. In the first place the impression carried *inwards* need not give rise to a sensation, need not be consciously perceived, but the phrase 'sensory nerve' suggests that the impression travelling along the nerve is *felt*. It is possible, and also common, for the impression, after reaching the reflex centre, to be transmitted to a higher centre, and there to arouse consciousness, but it is not *necessary*. Indeed the essence of a reflex action is that consciousness is not necessary for its accomplishment. Any nerve which conveys impressions *inwards* to a centre may convey an impulse leading to a reflex action. Therefore for sensory nerve the phrase 'afferent' (leading to or inwards) or 'centripetal' is now used. Secondly, the

reflex action need not result in viable movement, as the phrase 'motor nerve' suggests. The nerve which carries the excitation outwards may pass to a gland, and the stimulus may cause secretion, or may supply blood vessels and cause their constriction, or may be distributed to some other organ and modify its activity very materially, whether the modification be obvious or not. Therefore for 'motor nerve' the phrase 'efferent' (leading outwards) or 'centrifugal' is now used. In the third place, the nerve centre does not merely reflect the impulse received by the in going nerve along the out going nerve, the nerve centre does not play merely a passive part. Rather, roused by the in going stimulus, the centre is thrown into activity, and as a result discharges energy along out going nerves, leading to results dependent upon the kind of apparatus to which the nerves proceed. There is no doubt reflex actions play a most important part in life, and there is equally no doubt that many actions, at first performed consciously and by an effort of will, when they have become habitual sink below the level of consciousness, so to speak, and become reflex actions.

REFORM, PARLIAMENTARY See **BRITAIN**, under section Parliament.

REFORMATION, the term generally applied to the religious revolution in the sixteenth century which divided the Western Church into the two sections known as the Roman Catholic and the Protestant. Before this era the pope claimed, of divine right, and exercised, absolute authority over the whole Christian Church with the exception of those lands in which the Greek or Eastern Church had been established. Not only was his authority deemed supreme in matters of doctrine and discipline, but his decisions were held to be infallible, and whoever presumed to oppose them was held liable to such canonical censures and temporal penalties as the canon law prescribed. The pope, in virtue of his spiritual authority, also claimed the right of interfering in certain secular matters, especially with reference to the deposition of sovereigns who had fallen under the ban of the church, though the exercise of this supremacy was often rebuffed against, and even at times successfully opposed. Moreover the pope claimed, in virtue of the 'Donation of Constantine', to have rights over all islands, and he looked upon all parts of the world not occupied by Christians as uninhabited, and parcelled out these regions among their Christian conquerors according to his own supreme will. Such far reaching claims were naturally calculated to awaken jealousy and opposition, and these feelings were intensified by many other causes, such as the immoral lives and dense ignorance of many of the ecclesiastics, the exorbitant wealth of the church, the many personal immunities and privileges of the churchmen, and their encroachments on the jurisdiction of the laity. In the thirteenth century, papal extortions had roused great discontent in England, and the frequent occurrence of papal schisms considerably weakened the authority of the papacy. In the end of the fourteenth century, Wycliffe (about 1324-1384) denied the papal headship and the pope's power to bind and loose, and he advocated the abolition of the papacy. The writings of Wycliffe soon reached the Continent, and aroused Huss (1369-1415) and Jerome of Prague (1360-1416) with their Bohemian followers, but the fifteenth century was not ripe for combined opposition, and the leaders of the church were strong enough to suppress every attempt towards change, as appears alike from the conduct of the princes and the people at the breaking out of the Hussite disturbances, and from the results of the Councils of Constance and Basel. But about the middle of the

fifteenth century, the views of thinkers were enlarged by the revival of the study of classical literature in Western Europe, which followed the capture of Constantinople by the Turks in 1453 and the consequent dispersion of learned Greek scholars. (See **RENAISSANCE**) The means of information were vastly increased by the art of printing, materials for thought were brought before the people by instructive works in their own language, and by the new universities, of which seven were instituted in Germany alone between 1451 and 1502, the number of learned men increased. The Reformation was thus the outcome both of a desire for ecclesiastical and doctrinal reform, and of the purely literary movement known as Humanism (which see in **SUPP**). These had nothing in common except antagonism to the system of the Roman Church, and the opponents of the church never succeeded in bringing about a thorough sympathy among themselves. The reform which a great number of enlightened divines had long warmly advised with little success, now waited but the call of a master spirit. Savonarola (1452-98) arose for this purpose in Florence, but one funeral pile consumed him and his work together. Several monarchs also attempted something. Charles VIII of France caused the Sorbonne in 1497 to declare it expedient that a council should be held every ten years for effecting reforms in the church, and that otherwise the bishops should assemble for that purpose. Maximilian I of Germany laid before the Roman court the strong remonstrances of the German princes passed in 1500 and 1510. By the influence of France an independent council was held at Pisa in 1511 in spite of Pope Julius II, but although its few speakers conducted themselves with great boldness, it was soon overthrown by its own weakness and by the decrees of the Council of the Lateran, which was opposed to it in the following year. As a rule, in all the plans that had been proposed for the eradication of abuses in the church on the one side, political views had been too often intermixed, and on the other, in the heat of zeal against individual wrongs, the chief alleged faults in the doctrine and discipline of the church had been too much overlooked. Hence nothing took place but fruitless disputes and violent persecutions of the innovators, or futile political negotiations in which the Holy See always prevailed in the end. The services of John Reuchlin (1455-1522) in the cultivation of the Greek and Hebrew languages, and his victory over the opponents of the new learning in Cologne, had an important effect. The cultivated taste and the appreciation of scientific criticism which appeared in the writings of Desiderius Erasmus of Rotterdam (1467-1536), addressed to the most distinguished men in church and state, exerted a wider influence, and promoted the cultivation of classical learning and the diffusion of modified views on the subject of religion. Erasmus, in a well known letter to his English friend Dean Colet of St Paul's, declared that his hope was to 'remedy the error which makes religion depend on ceremonies and on the observance of bodily acts, to the neglect of real piety'. Erasmus was, however, himself a monk, and subject to the rules of his order, and he did not dare to take up too prominent a position. Of greater power over the mass of the people than the delicate raillery of scholars like Erasmus was the constantly increasing number of satires, epigrams, caustic allegories, and coarse jokes at the expense of the church and the monks, such as the famous tale of Renard the Fox. The centre of Europe, together with the north, which had long submitted with reluctance to Rome, was ready to countenance the boldest measures for shaking off the

ecclesiastical yoke. But no one anticipated the quarter whence the first blow would be struck. Frederick III, elector of Saxony, a wise prince and a zealous Catholic, only followed the example of other German princes in establishing a university at Wittenberg, whither, among other learned men, he, in 1508, invited Martin Luther (1483-1546), an Augustine monk of Erfurt, to be professor of theology. Luther was well acquainted with the Holy Scriptures, and by a visit to Rome in 1510 he became acquainted with the corruptions of the papal court. Leo X was created pope in 1513. He seemed placed at the head of the church merely to employ its revenues in the gratification of his princely tastes. Albert, elector of Mainz and archbishop of Magdeburg, a prince of similar character, received from Leo in 1516 permission to sell indulgences within his own jurisdiction, on condition of sharing the profits with the pope. (See INDULGENCE.) In this traffic Albert employed, among others, Johann Tetzel, a Dominican monk of Leipzig, who went about from place to place carrying on his trade in defiance of decorum, and extolling his certificates above the papal bulls (which required repentance) as unconditional promises of the forgiveness of sins. The buyers were numerous and the gain was great. When Tetzel commenced his traffic at Jüterbogk in 1517 purchasers flocked to him from Wittenberg. Such a traffic as this was peculiarly offensive to Luther, who had come to believe the Augustinian doctrine of justification by faith, and he set his face against the abuse, first in his sermons and afterwards in ninety-five theses or questions which he affixed to the door of the great church, October 17, 1517. In these he declared himself warmly against the abuse of indulgences (without absolutely denying their possible value), displayed a lively zeal for Holy Writ and the doctrines of the popes and fathers of the church, and concluded with a prayer for instruction. In assailing these abuses Luther, it is admitted by the Catholic clergy themselves, only gave voice to a wide spread feeling in Germany. He at once gained a number of adherents, among them men of influence in church and state. The Bishop of Würzburg wrote to the Elector Frederick to protect Luther, who urged his spiritual superiors and the pope to put a stop to the traffic of Tetzel and to reform the corruptions of the church in general. A heated controversy now arose, which was conducted both on the one side and the other in a style and manner not at all in accord with modern ideas of controversial courtesy. Luther characterized his adversaries as asses, pigs, dolts, &c., and in return was assailed with invective often of the coarsest kind. The replies written by Luther to his opponents were published, and continued to draw the attention of the world to the principles involved in the struggle. A disputation which the indefatigable reformer maintained in an Augustine convent at Heidelberg in 1518, on the merits of good works and the use of the Aristotelean philosophy, gained him friends among the young theologians present, like Bucer, Brenz, and others, who subsequently became celebrated as zealous advocates of reformation. The conferences of Luther with the papal legates Cajetan and Miltitz, in 1518 and 1519, seemed but to show the unwillingness of the papal party to defend their position by controversy, and to manifest their desire to decide by the absolute authority of a divinely established church, and thus the controversy which had originated in the single question of the abuse of indulgences came to involve the supreme authority of the pope and the doctrine of an infallible church. The scholastic discussions of Eck with Luther and Carlstadt at

Leipzig in 1519, which lasted three weeks, and in which they warmly debated the doctrines of free will, the authority of the pope, indulgences, and purgatory, attracted a more general attention to the works of Luther, who almost every month sent forth new pamphlets and printed sermons. In the following year Luther published an Address to the Christian Nobility of the German Nation, and a thesis on the Babylonish Captivity, in which he definitely broke with the church, denying the central doctrines connected with transubstantiation and the priesthood. The remarkable fulness and power of his style, his acuteness and learning, daily increasing by his constant historical and exegetical studies, his humour and keen reasoning powers, his vigour and vehemence and the entire lack of self-restraint which characterize his writings, made this man, who was hardly known before 1517, the champion of all those who held that the Holy Scriptures alone as interpreted by private judgment were the only true rule of faith and action. His growing influence attracted many earnest inquirers to the side of the new doctrines. Scholars like Erasmus gave him only a qualified approval, but from Melancthon (1497-1560) and Ulrich Hutter (1488-1523) he received enthusiastic support. His protest against indulgences was renewed in Switzerland by Zwingli (1484-1531), who afterwards formulated a doctrine of the Eucharist, which, as we shall see, widely differed from that of Luther. Meanwhile Luther continued his crusade against the papacy, the respect which he at first professed for the Roman court was now wholly cast aside, and he attacked with extraordinary zeal, and no little coarseness at times, the chief papal doctrines. In 1520, when Eck published the papal excommunication against him in Germany, he appealed to a general council, when his works were burned at Mainz, Cologne, and Louvain, he publicly committed the bull of excommunication with the papal canons and decrees to the flames (December 10) amidst the rejoicings of the students at Wittenberg. From this time Luther formally separated from the Roman Church, and many of the principal nobles - Hutter, Sickingen, Schaumburg, &c., the most eminent scholars, and the University of Wittenberg, to which the young men of Germany and other countries now flocked in multitudes publicly declared in favour of his undertaking. The natural sequel of the bull of excommunication was the ban of the empire, and Pope Leo X (1513-21) urged the Emperor Charles V to pronounce on the reformer the sentence of outlawry. The question was debated at the Diet of Worms (April-May, 1521). Luther attended under a safe conduct, and definitely refused to recant, appealing to the infallible authority of Holy Scripture and the right of individual judgment, and refusing to admit that he would change his views even should a general council pronounce against him. He thus alienated to some extent the sympathy of the Diet, and Charles succeeded in persuading it to agree to the issue of the ban against Luther, who had fled to the protection of Frederick of Saxony at the Wartburg. The effect of the edict of the Diet was to make the political side of the quarrel more prominent, and we must not overlook the political circumstances which favoured the progress of the Reformation. The pope had risen chiefly by the support of Germany, in his transactions with the emperor he had generally been supported by the German princes, who thus maintained their own independence. Rome had, therefore, been obliged to court them in turn, and the emperor congratulated himself in silence if disputes ensued between them. On the death of Maximilian I in 1519 the

Elector Frederick, who was already the most powerful German prince, held the dignity of a vicar of the empire in all the Saxon territories, and his personal influence gave him the most decisive voice in the election of the new emperor. The pope (as well as Charles V., who was chosen chiefly by Frederick's influence in 1520) was obliged to consult his wishes, the former in abandoning his original summons of Luther to Rome to a conference with his legates, and the latter in suffering the Reformation to develop without violent opposition as long as it allowed itself to be responsible to the pope and the Catholic states. By his ten months' seclusion in the Wartburg Luther was secured from the first consequences of the ban of the empire, and the edict of Worms lost its chance of being enforced in Saxony, because the emperor, engaged in 1521 in the war with France, or occupied with Spanish affairs, almost wholly lost sight of the religious ferment in Germany, and each prince did what he pleased in his own territory. Frederick the Wise, although he did not call himself an adherent of the reformers, yet protected the leaders of the movement, and his interest in their cause is explained by the concern which he took in the prosperity of the University of Wittenberg, and by his gradually-increasing conviction of the justice of the views of Luther and his friend Spalatin, who managed every thing at the electoral court. Leo's successor, Adrian VI., who was himself desirous of a reformation, received, in answer to his demand for the extirpation of the doctrines of Luther, a list of a hundred complaints from the German states assembled at the Diet of Nürnberg in 1522, in which even the Catholics joined against the papal chair. For seven years (1522-29) the emperor was absent in Spain, the Diet of Nürnberg had, while refraining from an open breach with the papacy and promising to silence Luther, yet declined to enforce the edict of Worms, and thus the people of Wittenberg were as little impeded in their attempts at a reform in religious worship as those of Zürich, whose rapid progress in the change of their religious doctrines and rites found the most powerful support in the governments of the northern cantons of Switzerland, and Luther was even obliged to hasten from the Wartburg to quell the tumults excited by the turbulent zeal of Carlstadt. While he was publishing his translation of the New Testament which was soon followed by the translation of the Old, and while Melancthon was engaged on his *Loci Communes* (the first and for a long time the best exposition of the Lutheran doctrines—first published in 1521) serious preparations for the reform of ecclesiastical abuses were made in Deux Ponts, Pomerania, Sillesia, in the Saxon cities, and in Suabia. Luther's liturgy had no sooner appeared (1522), than it was adopted in Magdeburg and Ebingen. The new church was not long without its martyrs. In 1522 the Inquisition in the Netherlands secured its title honour by the execution of some Augustines who favoured the new doctrines. Translations of the Bible into Dutch and French now appeared. In the very heart of France, at Meaux, a Lutheran church was organized. In vain did the Sorbonne condemn the principles of Luther, in vain was the execution of the edict of Worms against religious innovations resolved upon at the Diet of Nürnberg in 1524 and the Convention of Ratisbon, in vain did George, duke of Saxony, Henry, duke of Brunswick, the rulers of France, Spain, Austria, and the spiritual princes of the empire labour to suppress the Reformation by the persecution of the followers of Luther within their states. In 1525, John, the successor of Frederick

in the Saxon electorate, Philip, landgrave of Hesse, and Albert of Brandenburg, duke of Prussia, publicly declared themselves Lutherans. All their territories, together with Livonia, a considerable part of Hungary, and Austria (Bohemia had already been gained by the Hussites), Lüneburg, Celle, Nurnberg, Strasburg, Frankfurt on the Main, Nordhausen, Brunswick, and Bremen, embraced the new doctrines, and a great number of the most respectable clergymen and theologians in Germany followed the example of Luther, who had married Catherine von Bora, formerly a nun. The doctrines of the German reformer found a willing adherent in Gustavus Vasa, who in 1523 became King of Sweden. Gustavus induced the estates of the realm, in the Diet of Westeras (1527) to sanction the confiscation of the monasteries. Lars Petersen was appointed by the king Archbishop of Upsala (1531), and married. The king declared himself supreme in matters ecclesiastical, and deposed or appointed bishops at his will. The last remains of Catholic usages were abolished at a second Diet of Westeras in 1544. The first systematic measures in favour of the Reformation in Denmark were taken by Frederick I., instigated by his son Christian, who had studied in Germany and become an enthusiastic Lutheran. At a diet held in 1536 the assembly decreed the abolition of the Catholic worship in the Danish dominions, the bishops were required to cease all opposition to Lutheranism, and the benefited clergy to embrace it. The nobles and people yielded a ready acquiescence to all those changes. Contemporaneously, or very soon after, the new doctrines gained the ascendancy over the greater part of Lower Saxony and the north of Westphalia, and in Hamburg and Lübeck. During the period marked by the absence of the emperor, the Reformation advanced with astonishing rapidity, and almost without any impediment. Another important stage in the Reformation was marked by the two Diets of Spire (1526-1529). At the first Diet a motion for delay was carried under which such adherents of Luther as the Elector of Saxony and Philip of Hesse took the opportunity of secularizing monasteries and establishing the Lutheran faith. It was in this principle of allowing each state to come to a decision (a principle expressed in the formula *cuius regio eius religio*) that an ultimate solution was to be found. But meanwhile the reformers were weakened by internal dissensions, and the second Diet revoked the permission given by the *Recess* of 1526. Against this decision the reforming party entered a protest, whence they came to be known by the name of Protestants. The possession of a common name accentuated their new position as a distinct political party, and when Charles V. returned to Germany, prepared to take up a hostile attitude towards them, the Protestants were forced to adopt a more clearly defined position. They hesitated, however, to begin an open struggle with the emperor, now at the height of his power, and although they continued to carry on an active propaganda among the people, by means of Luther's catechisms, they decided to place their views before the emperor as moderately as they could. Melancthon was employed to draw up a full exposition of the Lutheran doctrines, which was subscribed by the princes already united by the League of Torgau (1526) and the Convention of Schwabach (1529), it was transmitted to the emperor at the Diet of Augsburg (1530), and solemnly read before the assembly (June 25), whence the declaration was called the Augsburg Confession. It stated the Lutheran doctrines in such a manner as to conciliate the church, laying less stress on the central doctrine of justa-

fication by faith, and defending the Lutheran departures from the ritual and practice of the church, without formally disowning the papal authority. After some hesitation, and a few spasmodic attempts at an understanding, the Diet of Augsburg reaffirmed the policy of the edict of Worms, and the Protestants were given till April, 1531, to renounce their heresies and return to the church. After this date strong measures were to be taken to reduce them to obedience. A similar reply was given to Strasburg, Constance, Memmingen, and Lindau, which had sent the emperor a similar paper styled the *Confessio Tetrapolitana* (Confession of the Four Cities). This conclusion of the diet was a new motive of union to the Lutherans. (For a history of subsequent events see *SCHMALKALDIC LEAGUE, INTERIM, and PEACE, RELIGIOUS*.) The German Protestants were united by common political interests and a common creed contained in the Augsburg Confession and its apology (see *MELANCTHON*), and illustrated by the Articles of Schmalkalden and the two catechisms, and finally confirmed in 1580 by the Formula of Concord (see *CONCORD, FORMULA OF, and CREED*). The Lutherans, or adherents of the Augsburg Confession, were the three electors of the Palatinate, Saxony, and Brandenburg, twenty dukes and princes, twenty four imperial counts, four barons, and thirty five imperial cities—in all eighty six members of the empire. Sweden and Denmark, Schleswig, Pomerania, and many important cities on political grounds, and Hesse and Bremen from a preference for Calvinism, refused to adopt the Formula of Concord. The Palatinate fell back, and the court of Berlin became Calvinistic or Reformed (see *REFORMED CHURCH*). The dispute concerning the body of Christ in the sacrament of the supper (see *LOMB'S SUPPER*) between the French and Swiss Protestants resulted in a total separation of the Reformed Church from the Evangelical or Lutheran. The foundation of this difference between the two churches so unfavourable to the progress of the Reformation, was deeply laid in the diversity of the characters of their founders. Luther, accustomed to think more systematically and to adhere implicitly to the letter of the Holy Scriptures, immediately brought every new idea which was suggested to this touchstone of his system, and admitted nothing which seemed opposed to that belief. Zwingli, less trammelled with fixed dogmas and more ready to follow his own judgment, was, on the other hand, more prompt to embrace those views which at first sight appeared reasonable to him. The influence of Zwingli was, however, small compared with that of Calvin, under whose guidance the Reformed (as opposed to the Lutheran) Church acquired great importance. Calvin held a view of the Eucharist which more closely resembled Luther's than did the doctrine of Zwingli, and his assertion of the divine right of the Reformed Church was not less emphatic than the papal claim itself. The east and north adhered to the opinion of Luther, the west and south followed the less circumscribed views of the Reformed Church. The influence of Calvin at Geneva brought the greater part of Switzerland into the Reformed Church, and he was followed by the French Protestants (see *HUGUENOTS*), by the Dutch of the United Provinces, and by Scotland, where Knox introduced, in 1560, a form of church government on the Geneva model which afterwards developed, under Andrew Melville, into Scottish Presbyterianism. The English Reformation, from 1530 to the death of Henry VIII in 1547, consisted merely in a renunciation of papal authority, and was in no case doctrinal, but under Edward VI. changes in doctrine and ritual were introduced largely under Calvinistic influences, which

(after the reaction of the reign of Mary, 1558–58) were themselves considerably modified under Elizabeth (See *CALVIN, ENGLAND (section Church)*), Henry VIII. KNOX, NETHERLANDS, and CREEDS.) In Transylvania the Lutheran confession prevailed. In Hungary, where numerous Germans had settled, bringing Lutheranism with them, the new faith made rapid progress, especially in the cities and among the nobles, but the subsequent civil wars, combined with the doctrinal contests between Lutherans (mostly Germans) and Calvinists (mostly Magyars) were prejudicial to its continued development. It gathered strength gradually, however, till it was weakened and reduced by the untiring labours of the Jesuits and the measures of the Catholic reaction. In Poland where the Reformation had found numerous adherents (from 1556), the two Protestant parties with the Moravian Brethren, concluded a convention (*consensus*) at Sendomir in 1570 which united them in one politico-religious body known as the Dissidents. Both in Italy and Spain Protestantism had several peculiar characteristics. Its adherents were mostly confined to the higher and cultivated classes, the Reformed faith taking scarcely any hold on the people at large. Protestantism, of course, was a name for no single theological system. Many held the doctrine of justification by faith in the same sense as the reformers but were by no means repugnant towards the old view of the sacraments and the hierarchical government of the Catholic Church. The associations of Protestants were generally secret. In Italy there was a wide spread desire for reform in the church in which many enlightened and zealous Catholics participated. Some of them were afterwards leaders of the Catholic reaction which aimed at the purification of morals and discipline of the clergy, but at the same time repressed dissent and schism with the strong hand. In Naples, Venice, Florence, and other cities Protestant churches were opened, and eminent preachers like Ochino, and theologians like Peter Martyr, privately espoused the new doctrines. These men were, however, driven from the country, and Protestantism was extirpated in Italy by the vigorous action of the Inquisition, by the instrumentality of the *Index Expurgatorius*, and the other agencies of the strict and ascetic party which held the ascendancy in the church. In Spain there were Protestant churches in Seville and Valladolid, and many persons of mark adopted the views of the reformers. But here also the Inquisition with its *autos de fe* succeeded in arresting the spread of the religious revolution. The Counter Reformation or Catholic reaction, towards the end of the sixteenth century, with the new religious orders which sprang from it, especially the Jesuits, succeeded, largely through the instrumentality of the Council of Trent (which defined the doctrine and reformed the discipline of the church), in recovering a portion of its revolted territory. The Counter Reformation received considerable impetus, as may be inferred from the preceding narrative, from the dissensions among the Protestants themselves. The final result throughout the Continent may be broadly stated to be that the Teutonic nations remained predominantly Protestant, while the Latin nations continued their adherence to the old ecclesiastical order of things. Whatever dissensions may have separated the Lutherans and Calvinists at the early period of their history, they had, and still have, the fundamentals of doctrine, the spirit and the name of Protestants, in common. In Germany, the Peace of Augsburg (1555) had established a *modus vivendi* between the Roman Church and the Lutherans, but no arrangement was made with regard to Calvinism,

and problems relating to ecclesiastical lands were left unsolved. These difficulties combined with the effect of the Counter Reformation to produce, in the following century, the Thirty Years' War (1618-48), which devastated Germany. The Peace of Westphalia (1648) established between the parties a legalized toleration, but the Protestant subjects of Catholic princes too often experienced its violation, and the Catholics in Protestant states not unfrequently suffered a similar fate.

After this general outline of the history of the Reformation it remains to give some views of the influence which the movement has exercised on the religion and morals, on the literary and political condition, of the nations affected by it. As may be naturally inferred, there is a wide divergence of opinion on this subject between the Protestant and Roman Catholic parties, and it is but just that the views of both should be as fairly stated as possible. Both sides would freely admit that there was urgent need for reform in the life and practice (if not in the doctrine and ritual) of the church, but, while Roman Catholics consider that such necessary changes could have been carried out on conservative lines, the Reformation was, according to the Protestant view, a necessary consequence of the mental progress of the western, and particularly of the Teutonic nations. Before the Reformation unscriptural views (according to the Protestants) with regard to the sacraments, veneration of images, and many other matters had established themselves. The doctrines of penance, confession, satisfaction, and absolution, that of the merit of works chiefly of those of an external kind, such as fasting, almsgiving, pilgrimages, and the like, impaired the free grace of the gospel, while public worship, being conducted in Latin, was unintelligible to the people generally, and could only satisfy by its supposed vicarious efficacy, or impose by its pomp and splendour. The ignorance of the common people blinded them to the wretchedness of their spiritual condition, but the better informed soon perceived that nearly all the devotion of the faithful was directed to things which do not really belong to Christianity. An open rupture with the pope gave the reformers the opportunity of throwing off the corruptions and foreign appendages of religion, both in doctrine and worship, and of restoring a Christianity which knows no guide but the Holy Scriptures. The idea that there is something for which a man is accountable only to himself and to his God, that in religion human authority is nothing, and that it is therefore the duty of everyone to study the Holy Scriptures for himself, and to rest his faith on his own convictions, that acts of worship derive their whole benefit from the faith of the worshippers and their effect upon the lives of those who take part in them, in short, a living commentary on the doctrine 'God must be worshipped in spirit and in truth', was spread by the preaching, and still more by the writings, of the reformers among the whole mass of the people. Thousands of the scholars of the universities, the friends of philosophy and of classical antiquity, intelligent citizens and discontented individuals of the inferior clergy had long been ready to share in the dissemination of those principles, princes, nobles, and even some bishops had been strongly influenced by the sweep of the new teaching. The success of their first appeals encouraged the reformers to venture the second step towards the restoration of what they considered true religion—by removing all obstructions to it in the forms of the church. Among these were the notion of a sacramental consecration of priests, the worship of saints, relics, and images, transubstantiation, justifying the worship of the

Host, extreme unction and masses for the souls of the deceased, which drew immense tributes from the fears of the dying and the grief of mourners, and a multitude of other customs which distracted and degraded devotion. From such a system, of which the priesthood was the centre, the religious spirit now turned to a faith which it might embrace without abandoning the use of reason, for the eternal truths of the gospel, by means of Luther's excellent translations of the Bible, and accurate versions in other languages, came unadulterated before the world at large, and appeal was made to Scripture in sermons, catechisms, and theological works in the vernacular tongue. Restored once more to its original destination, the Christian ministry among Protestants devoted itself exclusively to the labour of explaining the Word of God and applying it to spiritual improvement, of erecting schools for the neglected youth, and raising the character of those already existing, while the clergy renounced the privileges by which they had been distinguished from the laity. Every Protestant partook of the cup in the Lord's Supper, everyone could understand the simple celebration of divine worship, and could join in the sacred hymns. Thus, wherever Protestantism found its way, the worship of God recovered that simplicity, warmth, and sincerity which had characterized it among the early Christians. Religion now appealed to the reason and feelings of men, and invited close investigation. Not that this beneficial influence became at once universal and complete, or was interrupted at no period of the advance of Protestantism. If we examine the period of the Reformation and the spirit which animated its first friends we shall find it a time of contest and division, when the silent operations of the new light was blended with violent hostility towards those deemed false brethren. Hence the consistent opposition offered by Reformers like Calvin and Knox to anything approaching freedom of thought, an opposition which continued to characterize the Protestant Church for centuries, and which long prevented the free activity of the very motives which had brought about the Reformation itself. Hence the abusive language from the pulpits and in controversial writings, which, though abundantly provoked by the menaces, violence, and intrigues of the opposite party, and excusable from the rude tone and contentious spirit of the age, was nevertheless always unfavourable to the improvement of Protestantism. Hence the extravagances of precipitate innovators which the reformers could not resist without retaining more of the forms of the existing religion than a strict application of their principles would permit. Hence that war of opinions among divines which not only prevented the co-operation of the Swiss with the Saxon reformers, but also gave an accidental importance to certain points of comparatively small moment, such as the position of the words *Vater unser*, 'Our Father', in the Lord's Prayer, instead of *unsere Vater*. This was quite in keeping with deep religious feeling, which always remained a conspicuous characteristic of the Protestants. They thought too highly of their faith, they were too deeply convinced of its truth, to regard anything holy with indifference, they were ready if necessary to sacrifice their property and their lives in the cause of religion. And this religious feeling was nourished by the affecting solemnity of the devotional exercises which assembled the faithful in their churches, and in the quietness of the domestic circle, while it was strikingly manifested in the composition of many fine hymns which passed from mouth to mouth, and of which no religious body probably ever possessed more than

the Protestant churches of Germany and France.

The Reformation is generally admitted to have had an important influence on *morals*. While the reformers abolished the principle of blind obedience to the pope and other ecclesiastical dignitaries, denied the merit of penances, fasts, pilgrimages, &c., rejected the identification of the outward observance of the precepts of the church with virtue, and denied the doctrine of works of supererogation by which saints had enriched the treasury of the church, they introduced that more elevated morality which requires holiness of heart and purity of conduct. While the reformers suppressed what they deemed errors respecting the doctrine of remission of sin, they elevated and purified the standard of morality, and directed penitents to seek for reconciliation with God only by faith and new obedience. While themselves tending towards an undue asceticism, they nevertheless rendered a service to humanity by denouncing the doctrines which represented self torture, solitude, poverty, nakedness, filth, hunger, misery, and even privileged beggary and idleness, as pleasing to God and steps towards the highest perfection. The teaching of the reformers emphasized also the intimate connection of religion with daily life, furnishing purer motives of action, and kindling the moral feelings to a warmth which produced the most valuable fruits in all relations both public and domestic. The moral tone of the Protestants could not long remain at such a pitch in proportion as their numbers increased, unworthy members found their way into the church. Moral improvement was sometimes neglected in consequence of the zeal for orthodox opinions, and an abuse of Luther's doctrine—that faith is the only way of salvation—was sometimes made an excuse for a vicious life. But notwithstanding this the morality of the adherents of the Reformation received from Luther's influence much firmness and constancy. Institutions were founded in the cities for the instruction of the young and the relief of the poor, laws were passed for the promotion of morality, industry was encouraged by the abolition of superfluous festivals, and a public feeling was formed distinguished for strictness, purity, and power over the minds of men. Reformed Switzerland, and especially Geneva, where Calvin introduced a system of church discipline, and instituted a court of morals composed of clergy and lay men, presented an example of purity unique in its kind, which was imitated by the societies of France and Holland, and the Presbyterians of Scotland and England—although, it must be confessed, not always with actual results proportional to the theoretical system.

The influence of the Reformation on *literature* has been highly important. An acquaintance with classical antiquity at the beginning of the sixteenth century was a luxury only enjoyed by a few distinguished scholars, and even though ecclesiastical disciplinarians might allow classical reading, they could not tolerate philosophical deductions therefrom nor a practical application thereof without the risk of open revolt. The study of the ancient languages, the general use of Latin as a medium of literary intercourse, and the invention of the art of printing promoted the progress of learning, but the only atmosphere in which they could flourish, and the only direction in which they could be of general utility, they received through the Reformation. This broke the fetters in which the hierarchy had bound the human mind, wrested from the clergy the abused monopoly of knowledge, awakened a spirit of investigation and a love of learning, and opened to criticism, in all branches of knowledge, a boundless field. Among the first promoters of it there were

some men who loved tranquillity, and who, like Erasmus, remained ostensibly attached to the ancient church, but their principles, their exertions, the spirit of their works, showed beyond dispute that they belonged to the party of the reformers. The Bible being now acknowledged as the only rule of faith, it became the duty of every theologian to understand the Greek and Hebrew text. A multitude of old Latin and Greek manuscripts, which till then had not been at all or but partially understood, were brought to light from the libraries of the suppressed monasteries and by the critical diligence, mostly of the Protestant literati, were made capable of being more generally used. Science sprang into new existence with the vigour of youth when Melancthon and Calvin were the teachers of Germany and France. But it cannot be argued that the Reformation fulfilled its promise in the direction of promoting freedom of thought and the liberty of the press. The protest against the intellectual tyranny of the Roman Church was indeed, a notable instance of what might be accomplished in this direction, but having won the freedom which they themselves desired, the reformers became too generally opposed to granting the same privilege to others and freedom of thought had to be won from the successors of the reformers, much as the reformers had themselves won it from Rome.

The influence of the Reformation on the *fine arts* was admittedly unhappy. It removed the paintings and images from the churches, and deprived the masses of the educative influences of the Roman ritual. It repressed the activity of the imagination, and taught men to feel a dignity in despising things that operate through the senses, and to abstain from outward splendour. This severity to the arts, which cut off their connection with religion and robbed them of that share of public veneration which they had received from Catholicism, met with its punishment in the decline of art among the Protestants. This was particularly the case with the Calvinistic party, for the Lutherans retained many paintings in their churches, and celebrated religious festivals with music and some degree of pomp.

But the most visible consequences of the Reformation and those long since most fully acknowledged in history, are those which relate to *politics*. The church was no longer a foreign power supreme over the state, whose supremacy in all civil matters was now recognized. A large proportion of the abuses of the ancient religious usages, in which all ranks found a motive to urge the reformation of the church, rested on the political encroachments and pecuniary demands of the popes. On them, not the clergy only, but the nations and princes were made dependent, to them they were obliged to pay enormous and ever-increasing tributes under various pretexts. Their influence extended to a great part of the administration of public justice in consequence of the ever augmenting extent of the episcopal jurisdiction, and the power which the papal legates assumed to the injury of the bishops. Hence the princes were perpetually interrupted in the exercise of their authority by the church, which formed as it were an *imperium in imperio*—a state within the state. The kings of France and the kings of England had long fought against this system, but, especially in England, not only the papacy but the church at home had opposed all such efforts. The English church before the Reformation was, indeed, thoroughly papal. The practice of the Protestant churches, in this respect, varied considerably. The Swiss reformers, for example, were far bolder than those of Wittenberg, they were favoured with republican institutions, and acted with the consent of their rulers. The course of

the Reformation in Protestant Germany and Switzerland generally was this. The communities, particularly in the cities, negotiated with their rulers according to their own consciences and by the advice of the reformers. The princes concurred in their plans, and established constitutions accordingly. In Prussia, Sweden, Denmark, England, and those German states which came over later, the princes made changes of their own accord, and the people sank gradually into the new forms imposed upon them. But in Scotland, when the minority of James VI afforded the reformers an opportunity of exercising political domination, the Presbyterian church practically held the reins of government, and the young king, on assuming royal power, had to meet far higher ecclesiastical claims than any of his ancestors had been called upon to face. The reformers wished to possess, in Scotland, all the influence which their Swiss brethren wielded in Geneva, and similar ambitions, within their own area, actuated the Huguenots in France. Where the government continued Catholic the friends of the new doctrines exercised their worship in secrecy. The Reformation liberated the princes from all the grievances which then depended on a foreign spiritual power had brought upon them. The return of the clergy to civil society increased the number of their subjects, and various causes augmented their resources and the prosperity of their people beyond computation. These were the acquisition of the church estates which had come under their power, or, as in the case of suppressed convents, into their possession; the cessation of the vast emissions of money from their estates which had been occasioned by the demands of Rome, the efforts of legates, the privileges of foreign archbishops, the begging of mendicant friars, and the connection of the religious orders with foreign governments. Another cause was the new spring given to commerce, trade, and agriculture, and the increase of population caused by the immigration of their exiled brethren in the faith. And a religion which till the Peace of Westphalia was really or ostensibly the chief motive of the civil alliances and wars was also the subject dearest to the heart of every individual, the animation of the people prompted them to risk their wealth and their blood in the cause of their rulers. Thus the Protestant princes became great, and states of small extent obtained a high political importance for which they were mostly indebted to the Reformation. Although the patrimony of the ancient church fell very largely into private hands, yet a certain proportion was devoted to public purposes, and the incomes of the lower clergy were augmented. With the goods of the church the persons of the clergy came likewise under the jurisdiction of the temporal princes. The influence of the Reformation has not merely been felt by the nations which have adopted its principles, the states which have most violently opposed it have learned from experience the danger of attempting to repress the operation of deep-rooted and wide-spread convictions. If Charles V had cherished sufficient love for the Germans and for the cause of evangelical religion to sacrifice to it his Spanish crown, he might have preserved Germany, which in his time was almost entirely devoted to the new doctrines, from the bloody religious wars which afterwards desolated it. The struggle of Spain against the new doctrines procured her more hatred from Europe generally than honour from Rome and was followed by the decline of her greatness. France—whose kings acted in conformity with their maxim to use the Reformation abroad as a means of exciting dissension among the neighbouring powers, and to suppress its doctrines within their own dominions—expated the

guilt of her double-dealing in the ruinous civil wars and the emigrations which it occasioned. Still more pernicious was the opposition to Protestantism in the case of Poland, for the destruction of which Russia made use of the same policy which France had employed with tolerable success in Germany, namely, affording support to the Dissidents and entering deeply into its internal dissensions. The Italian states, which tolerated nothing that savoured of reformation, sank more and more into political insignificance, but their decline may be rather attributed to the discovery of a passage to the East Indies by sea, and the intercourse with America, than to the Reformation. The popes struggled against the Reformation with resolution, and, in some cases, with success. In the states which continued faithful to the church they established institutions for resisting the progress of the new doctrines, and for the persecution of heretics. By their missions to Asia and America they gained a spiritual dominion over territories more extensive than the half of Europe, which they had lost by the Reformation. But no mission could compensate for what they had formerly drawn from Germany, England, and Scandinavia. Even the Catholic princes by degrees grew more prudent, and diminished the power and revenue of the papal court in their states, particularly after the Peace of Westphalia. In Germany (Austria and Bavaria), in France, and even in Spain, principles and opinions were imperceptibly propagated which made them partakers of the new light that had spread over Europe, and led them in course of time to disregard the behests and defy the excommunications of the Holy See.

The above are mainly the judgments of Protestants regarding the Reformation. Roman Catholics writers of the stricter school even refuse to recognize its title unless accompanied by some deprecatory qualification, such as 'Pseudo Reformation', 'So called Reformation', or the like. According to their ideas the true and Catholic Reformation was undertaken and successfully accomplished by the Council of Trent (1545-63). With respect to the movement itself, Roman Catholics, while admitting that many rampant abuses which called for reform existed in the church, that many of the ecclesiastics were grossly tainted with immorality and sunk in deep ignorance, and that many superstitions prevailed which deformed the true character of Christianity among the unlightened masses, yet contend, on the other hand, that not only have the extent and nature of these abuses, immorality and superstitions, been greatly exaggerated but also that the duty of reforming them implied neither the necessity nor the lawfulness of a secession from the church. They hold that the conduct and character of many of the prominent promoters of the Reformation unquestionably prove them to have been actuated by corrupt and unworthy motives, that their opposition to the authority of the Holy See was a rebellion against moral and disciplinary restraint rather than an active endeavour to restore the pristine purity of the church, that the movement in many of the states in which it took place was inaugurated mainly by the sovereigns, as in England, Denmark, and Sweden, in order to secure to their own use the revenues of the church, and that in others, as in Switzerland and many of the German states, it was effected by coarse and heated appeals to the passions and prejudices of the excitable and unreasoning mob, which had been led to confound the existing system with its abuses, and was incapable of distinguishing the genuine teachings of the church from the superstitions which the church itself zealously denounced. After the first flush of

conquest Protestantism never made any advance in territory. It remained stationary, and even in some cases receded in favour of Catholicism. 'The geographical frontier between the two regions', says Lord Macaulay, 'has continued to run almost precisely as it ran at the close of the Thirty Years' war', and he adds, 'We think it a most remarkable fact that no Christian nation which did not adopt the principles of the Reformation before the end of the sixteenth century should have adopted them'.

As to the influence of the Reformation on morals, literature, and politics, the same wide difference of opinion exists between Catholics and Protestants. The attempts at reformation before the sixteenth century which had been made from within the church itself had exercised but little effect and Catholic authorities admit that the influence the new movement had in stirring up the church and bringing about internal revival was of immense benefit. They, however, look upon the revolt against authority, the introduction of religious innovation, leading naturally to narrow and bigoted sectarianism on the one hand and scepticism and infidelity on the other, as pregnant with moral and intellectual evil. The unquestioning allegiance of the uneducated multitude to the pope, and to the doctrines and traditions of the ancient church, was merely converted into an equally unreasoning submission to the leading reformers, and to a rigid creed worship which had all the objectionable elements of superstition about it that had been condemned in Catholicism. Auster asceticism was no longer confined to the monastic cell but often settled down over entire communities, robbing daily life of most of its graces and amenities. Bitter and irreconcilable quarrels broke out in thousands of family circles from the discussion of the theological dogmas which both parties but imperfectly understood. The Catholics assert, too, that instead of encouraging learning the reformers did quite the reverse. They denounced classical and scientific studies as a snare of the devil and even Biblical criticism was discouraged. The general condition of the universities became deplorable, their professors becoming noted only for their pride, laziness, and unbridled licentiousness, and their students for debauchery, gambling, blasphemy, and obscenity, and so flagrant did this become that parents dreaded to send their sons to these seats of learning—See D'Aubigne's *History of the Reformation*, Hauser's *Geschichte des Zeitalters der Reformation* (English edition), Symonds' *Renaissance in Italy*, Foxe's *Book of Martyrs*, Burnet's *History of the Reformation*, McCrie's *Life of Knox*, &c., Johnson's *Europe in the Sixteenth Century*, Armstrong's *French Wars of Religion*, Runkle's *History of the Reformation*, Beard's *The Reformation in its Relation to Modern Thought*, Blunt's *Reformation of the Church of England*, the histories of England by Lingard, Froude, Green, &c., and of Scotland by Tytler, Hill Burton, &c.

REFORMATORIES, institutions for the reception and reformation of juvenile offenders under sentence for criminal offences. They appear to have originated in the efforts of philanthropic persons to establish places of refuge for such children after sentence. A farm school for the training of vagrant children was established by the Philanthropic Society in 1788, this was followed, after a long interval, by a second, established in Warwickshire in 1818, this proved unsuccessful, as did another founded by Capt. Brenton in 1830. In 1834 the reformatory for girls at Chiswick, known as the Victoria Asylum, was opened. Thirteen years later was founded the St. George's Institution, London, which, on its removal to Redhill in 1850, became the model for numerous

others which now rapidly sprang up in the country, and which were supported by the contributions of the benevolent. The 17 and 18 Vict. cap. lxxxvi first authorized the sending of children under sentence to these private foundations. Further acts regulating these institutions were passed in 1854 and 1857, and in 1866 all the laws relating to these schools were consolidated and amended by 29 and 30 Vict. caps. cxvii. and cxviii, which has itself been amended by subsequent acts, including those of 1893 and 1899. The home secretary may upon the application of the managers of any reformatory, direct an inspector of prisons, who is styled inspector of reformatory schools to inquire into the condition of the school and report thereon, and may if satisfied with the report, certify that the school is fit for the reception of youthful offenders. Any offender under sixteen years of age who is convicted on indictment or by a court of summary jurisdiction of an offence punishable with penal servitude or imprisonment if not less than twelve years of age, or if previously convicted of an offence punishable with penal servitude or imprisonment may be sent by the justices before whom he is charged to a certified reformatory school, to be there detained for a period of from three to five years such as will expire at or before the time when he attains nineteen years of age, and the justices shall as far as possible, select a school conducted in accordance with the religious persuasion to which the offender appears to belong. The parent or guardian of any offender sent or about to be sent to any reformatory (or industrial) school may apply to have him removed to a school conducted in accordance with his religious persuasion. After a detention of eighteen months the managers may grant a license, renewable every three months, to permit an offender to live with any trustworthy person willing to receive him, but the license may be revoked at any time and an offender escaping from the person with whom he is placed is liable to the same punishment as if he had escaped from school. The managers may also, if an offender has conducted himself satisfactorily while out on license, bind him with his own consent to any trade or calling, even if his period of detention has not expired. Towards the maintenance of each child the Treasury contributes a fixed sum of 6s. per week, a portion of which (not more than 5s.) is recoverable from the parents, if they have sufficient means. Children under twelve years of age guilty of offences punishable with imprisonment, but who have not been previously convicted of felony, may now be sent to certified industrial schools, and also children under fourteen found begging or receiving alms, whether actually or under the pretext of selling anything, or being in a street or public place for the purpose of begging or receiving alms, children found wandering and not having any fixed place of abode, or proper guardianship, or visible means of subsistence, children found destitute, either being orphans or having a surviving parent who is undergoing penal servitude or imprisonment, and those children who are known to frequent the company of reputed thieves. The Youthful Offenders Act of 1901 made provisions intended to reduce the number of very young offenders committed to reformatories and industrial schools. See INDUSTRIAL SCHOOLS.

At the end of 1860 the number of certified reformatories in existence in Great Britain was 59, the number of young persons confined in them being 7741. According to the forty fourth report of the inspector of reformatories, issued in 1901, the number of reformatory schools was then 48, 35 being for boys only, and 13 for girls only. Of these schools 40 were Protestant, 8 were Roman Catholic. The

number of offenders in the reformatories at the close of the year was 5611, of whom 4953 were boys and 658 were girls. The average net cost per head for maintenance, including rent and expenses in disposal, and setting off the profit from labour, was boys' reformatories in England, £21, 12s 3d, in Scotland, £19, 19s 9d, girls' reformatories in England, £21, in Scotland, £25, 6s 8d. In the United States there were at a recent date about 40 reformatories, having an annual average of 12,000 inmates, of whom 1000 were girls. The average cost of maintaining each inmate was £23. The importance of making such institutions a part of the public penal system was first practically recognized by Massachusetts in 1848.

REFORMED CHURCH, in a general sense, comprehends all those churches that have been formed by separation from the Church of Rome, but the term Reformed is often restricted to those Protestant churches which did not embrace the doctrines and discipline of Luther. The title was first assumed by the French Protestants, and afterwards became the common denomination of all the Calvinistic churches on the European continent. It is in this restricted sense that we wish it to be understood in the present article. The same need of a reformation of the church which excited the zeal of Luther in Germany, in the first half of the sixteenth century, induced many distinguished literary men and clergy men in Switzerland and the Netherlands, in England and France, to labour for the same end. Among the Swiss Ulrich Zwingli and Johann Ecclampadius (see these articles) were the most prominent. When the Franciscan Bernard Samson, a kindred spirit with Tetzel, preached the efficacy of indulgences with equal shamelessness, and came to Zurich, where Zwingli was a religious teacher, the latter violently attacked him, and the Council of Zurich seconding his zeal Samson was not tolerated in the city. In vain did a Papal nuncio labour to put down the reformer, and in vain did the Swiss Confederacy warn and threaten him. After many changes in the forms of public worship, on his own responsibility, in 1523 he transmitted sixty-seven propositions in German, in which he set forth his doctrines, to the Council of Zurich, the council gave them to the world, and invited the reformer to a disputation, and attended, with many of the citizens, when it took place. A large part of the audience was gained over to his sentiments. The work of reform was now carried on with impetuosity, and much that was in itself innocent, and perhaps even useful, was abolished. The altars, fonts, and images were banished from the churches, even vocal music and the organ were proscribed. The confederacy, January 26, 1524, at the Diet of Lucerne, threatened to exclude Zurich from the council, but she stood firm, and the town of Muhlhausen soon declared in favour of the new doctrines. Capito (Koflin) introduced the Reformation into Basel, and after 1523 Ecclampadius continued his work. In 1524 the first efforts for a Reformation were made at Schaffhausen. From 1525 Berne also was more inclined to the same, and even the zealous Catholic cantons began to feel their need of it. At length a religious disputation took place in 1526. Here Ecclampadius maintained the contest against a large number of vehement Catholics, among whom Eck was most prominent. Zwingli did not appear, and the Papal majority issued against him a sentence of excommunication, but they could not obstruct his influence. Berne resolved, in 1528, upon another disputation, though against the will of all the other cantons and the emperor himself. But nothing was settled, and the only consequence was that the people of Berne were more decided in favour of the Reformation. It

now spread more and more, notwithstanding all the resistance of the Catholic cantons—Schweitz, Uri, Unterwalden, Zug, and Lucerne. A large proportion of the confederates had already become devoted to the Protestant doctrines, when these Catholic cantons, having formed an alliance for the defence of their opinions with King Ferdinand (brother of the Emperor Charles V.), prepared to appeal to arms. The Catholics renounced all connection with the Protestants, and in October, 1531, Zurich, abandoned by the rest of its party, was forced to appear on the field alone. October 11 her soldiers were defeated at Cappel. Zwingli himself, who led his adherents, fell in the battle. But the bloody defeat did not check the progress of his opinions. Zwingli had made known his doctrine, that the bread and wine in the Lord's supper are mere symbols of the body and blood of Christ, in a letter published much against his will, November 16, 1524, and had first declared them publicly, in 1526, in his Commentary on True and False Religion (*Commentarius de vera et falsa Religione*), and afterwards in many controversies with Luther and others. His religious views, in general, were characterized by a reference to reason. By his restless spirit of inquiry, his peculiar sagacity, and moving eloquence, he succeeded in raising his own notions to a dogmatical authority in the Swiss churches. Out of Switzerland, too, his system found much favour, and in several countries became the prevailing one. The churches, however, which inclined to his doctrines, were early divided in various ways, and a perfect union was never effected. Zwingli himself lived too short a time to bring about a complete organization of the Swiss churches. Ecclampadius, who was the pillar of the new church after him, was soon removed by death. But even during his life Zwingli never had that decisive authority among his adherents which Luther possessed among the German Protestants, and which led to a greater unity among them. The other Swiss reformers did not stand in the same relation to Zwingli as the German reformers did to Luther, they acted more independently in the work of the Reformation. But there soon arose a man in the Swiss Church who acquired most important authority, and even gained over many Swiss and French Protestants to the opinions in which he differed from Zwingli. This man was John Calvin, who, fleeing from France, found an asylum in Geneva, and soon acquired the greatest influence. In his doctrine concerning the Lord's supper he differed somewhat from Zwingli. But the doctrines of election and predestination he made the distinguishing characteristics of his system, and his opinions on these subjects excited opposition, and awakened new dissensions in the Reformed churches. Before his death the ecclesiastical relations of Switzerland were more fully settled, and Glarus, Appenzell, Biel, the Grisons, and Neuchâtel, became attached to the Reformed party. This party, however, never formed a proper church with a uniform creed. In 1530 Zwingli had made known his own creed and the creed of his adherents to the Diet of Augsburg, where the German Protestants also set forth their profession of faith. But this was not the universal creed of the Reformed party, and did not secure their recognition as a church by the secular authorities. The Swiss, however, to secure the aid of the Protestants in Germany against the Catholics, sought a reconciliation with the Lutherans, but the Wittenberg Concord, so called, failed of effecting its object. Afterwards, in 1549, in the Consensus Tigurrinus, the controversy between the people of Zurich and the Calvinists of Geneva was composed, but even then there was no true union of doctrine. At length, in the Peace of Westphalia, it

1648, the Swiss were recognized as adherents of the Augsburg confession and a religious party. But they did not adopt the Augsburg confession unconditionally, or acknowledge it as their symbolical book. At length, after tedious contests, Heidegger, a divine of Zürich, in 1671, drew up the Formula Consensus Helvetica, in twenty-six articles, with particular reference to the existing disputes among the Reformed theologians. This new form of concord, after 1675, was gradually adopted by the Reformed Swiss cantons, but by several of them only nominally, and a perfect concord could never be effected in Switzerland. Out of Switzerland the Reformed party were decidedly opposed to it, and thus new dissensions were kindled. In the midst of the severest contests the Reformation had spread through the Netherlands, where the majority of the Protestant party adhered to the doctrines of Luther, but the Netherlands confession of 1551 inclined to the Swiss creed, and it was afterwards greatly altered. Maurice, prince of Orange, whom the Netherlands termed the preserver of their civil liberty, was an advocate of the latter. Soon, however, a violent controversy was kindled here among its adherents, when Arminius attempted to soften the Calvinistic doctrine of predestination, and Gomarus, his colleague in Leyden (especially after 1604), violently opposed him. Excellent men, such as Hugo Grotius and others, agreed with Arminius, and after his death Simon Episcopius (Bishop) defended his opinions. But the contest grew more and more violent, for political motives became interwoven with religion. The Arminians—now called *Remonstrants*, from their *Remonstrantia*, or confession, transmitted in 1610 to the States of Holland—were cruelly persecuted by the Gomarists, or Contra remonstrants, and the religious conferences at the Hague and Delft led to no reconciliation. At length, in 1618, the celebrated Synod of Dort was convened, and after protracted deliberations, rejected the doctrines of the Remonstrants in May, 1619, and confirmed the severe, but somewhat mitigated doctrine of predestination. But foreign theologians would not concur unconditionally in the decrees of the synod, the Remonstrants maintained their standing as a distinct party, and published, in 1621, a distinct creed, composed by Episcopius. In France the Reformed party (see HUGUENOTS) was exposed to the severest attacks, by the edict of Nantes, in 1598, they first enjoyed toleration. But although they submitted to the doctrines of Calvin, they had no firm bond of union within themselves. The English Church, which is reckoned among the Reformed, was instituted in so peculiar a way, was involved so early in controversies among its members, and divided into so many parties, that it hardly deserved the name of one church. The creed of 1551, which consisted originally of forty-two articles, but was reduced to thirty-nine articles in 1562 by the Synod of London, and was neither purely Zwinglian nor Calvinistic, could not unite the contending parties. See ENGLAND—Church. The Reformed system was introduced into Scotland by Knox, and this country has never swerved from its loyalty to its doctrines and discipline.

REFORMED PRESBYTERIANS, or CAMERONIANS, a body of Christians who profess to hold the principles of the Church of Scotland at the period of the second Reformation, between 1638 and 1650. They claim to be the legitimate descendants of that section of the Covenanters which was headed by Cameron and Cargill, who considered that Charles II. had forfeited all title to their allegiance, having broken the solemn vows which he made at his coronation. This open refusal to acknowledge the right

of a monarch to the obedience of his people exposed them to the special hostility of the government, and brought upon them such severe and complicated trials that they took to themselves the expressive designation of the Persecuted Remnant. They were also called Society People, from the circumstances that they early formed themselves into societies for mutual encouragement and improvement in the troublous times in which their lot was cast. When William of Orange was called to the throne in 1688 they were among the first to welcome him as the expected deliverer of their country from the oppression and tyranny of the house of Stuart, but while they avowed their readiness to yield all loyal obedience and submission to William, they openly declared their dissatisfaction with the Revolution settlement, as in their view radically defective, inasmuch as it disowned, or at all events did not recognize the second Reformation and Covenants, besides maintaining the authority of the civil government over the church, thus trampling under foot the spiritual independence of the Church of Christ. The fault of these arrangements was not wholly attributed to King William and the state, the Church of Scotland also, by her inactivity and temporizing policy, had involved herself in no small share of the blame. In these circumstances the Society People, in order to maintain their consistency, protested against the conduct of the king on the one hand, and of the church on the other, as an open departure from the principles of the second Reformation and the solemn obligations of the Covenants. The position which the sect was thus compelled to occupy was that of dissenters from the church and protesters against the state. For upwards of sixteen years after they had publicly avowed their principles, however, they remained in an unorganized condition and without a regular ministry, and even although some years before the Revolution societies had been formed, which to some extent bound them together as a united body, twenty years elapsed after that momentous era in British history before they enjoyed the ministrations of stated parsons. The first who exercised this office connected with the body was the Rev John McMillan, who in 1706 demitted his charge as parish minister of Balmaghie, and cast in his lot with the supporters of covenanted reformation. Aided by a licentiate, Mr John McNeill, who had also seceded from the Establishment, Mr McMillan laboured for many years, preaching and expounding the principles of the sect in almost every part of Scotland. In 1743 he met with a zealous coadjutor in the Rev Thomas Nairne, who had left the Secession body, and there being now two ordained ministers a presbytery was formed, which assumed the name of the Reformed Presbytery. Before its organization the body had issued a declaration of testimony, but it was not till 1761 that a full testimony was issued embodying the principles of the Reformed Church of Scotland in the days of her greatest purity as a Church of Christ. As they hold strictly to the Covenants, and theoretically reject the Revolution settlement, they occupy a peculiar political position, refusing to recognize any laws or institutions which they deem not in harmony with those of Christ's kingdom. Many members of the sect formerly isolated themselves from general society, and refused several of the responsibilities and privileges of citizens. From the date of their ecclesiastical organization they gradually increased in numbers, in 1810 three presbyteries were formed, and in 1811 a synod was constituted. The number of presbyteries was afterwards increased to six, and the number of ministers rose to about forty. In 1863 a split took place in the body on the question of the

propriety of taking part in elections of members of Parliament, a minority, holding that it is not right to do so, breaking off from the main body. Since then this minority has been organized as a separate church under the name of the Reformed Presbyterian Church of Scotland. It is divided into two presbyteries, those of Edinburgh and Glasgow. The larger of the two bodies no longer exists, having united with the Free Church of Scotland in 1876. A Reformed Presbyterian Church also exists in Ireland and America.

REFRACTION. When a ray of light passes from one medium into a second of different density its path in the second is inclined to its path in the first, and this bending of the ray is called refraction. When a ray of light enters glass from air it is bent towards the normal, and it is found that whatever may be the angle of incidence, the ratio of the sine of this angle to the sine of the angle less than it by the amount of the refraction is constant, this ratio is called the index of refraction for glass. The index of refraction between any other pair of transparent mediums is constant for different angles of incidence, but the indices of refraction for different substances are different. If the ray had entered air from glass it would have been bent from the normal.

REFRACTION, DOUBLE. If a crystal of Iceland spar be placed on a black dot mark on white paper, two dots will be seen through the spar, and, as the crystal is turned round, one of these dots will revolve round the other. One of the dots appears nearer than the other, and this is that which remains stationary on turning the crystal. It is called the ordinary image, the other is the extraordinary image. These two images are the result of double refraction. In uniaxial crystals elasticity for light is the same for all vibrations executed in directions perpendicular to the axis, and for vibrations in other directions the elasticity varies with the inclination of the direction of vibration to the axis. Iceland spar is a *negative* crystal, in *positive* crystals the extraordinary image will appear the nearest of the two images.

REFRACTOR, or REFRACTING TELESCOPE. See TELESCOPE.

REFRIGERANTS are medicines used to diminish the heat of the body either locally or generally. Refrigerants are divided into two classes: those applied externally to the body, and those given internally. The former class consists of evaporating and cooling lotions, as vinegar or alcohol and water, solutions of sugar of lead, sulphuric ether, the cold bath, iced water, and ice alone or combined with salt. The second class includes all remedies which reduce the heat of the body by acting on the circulation, as the vegetable acids, sulphur, nitrate of potash, cream of tartar, and the various saline purgatives. Among refrigerants may also be reckoned diaphoretics and blood letting. The external and local use of refrigerants has in recent practice been greatly extended, both as an antidote to inflammation and as an anodyne and sedative in surgical operations and analogous cases.

REFRIGERATING MACHINES, machines for artificially producing a temperature capable of freezing. Various machines, differing in construction and even in principle, have been invented and are now in use for the manufacture of artificial ice. One part of the process, which appears to be the most commonly used in machines in which ice is manufactured on a large scale, relates not to the production but to the transmission of cold. Instead of withdrawing heat directly by the cold-producing apparatus from the water to be frozen, it is found convenient, for many reasons, to provide a refrigerating medium, from which heat is first extracted by the original process of refri-

geration, and which is then used to extract heat from the water to be turned into ice. As salt water will bear a degree of cold much below the freezing point of fresh water, it is found convenient to employ it for this purpose. The fresh water is placed in a tank divided into cells intersected by channels from which they are separated by water-tight partitions. The refrigerated salt water is allowed to flow through these channels, and by withdrawing the heat from the water freezes it fast to the sides of the cells. It is then suffered to flow on and return to the refrigerating apparatus, while the channels are filled with hot water, by which the ice is liberated from the cells, and may be removed in blocks.

There are three leading principles adopted in the construction of refrigerating machines—that of producing cold by evaporation in *vacuo*, without auxiliary power, that of producing it by the compression and subsequent expansion of air, that of producing it by the rapid evaporation of liquid ammonia, sulphur dioxide, carbon dioxide, cyanogene, rhigolene, or other highly volatile liquid. Liquefied ammonia is most extensively used by two different methods. In the *compression system*, the compressed gas is liquefied by passing through a coil over which cold water flows. It is then rapidly expanded and consequently vaporized, intense cold being produced. The other type of machine, the *absorption machine*, is best represented by the Carré ammonia freezing apparatus. Concentrated hydrate of ammonia is heated in a closed iron vessel, and the gas driven off is liquefied by its own pressure in another iron vessel. The first vessel is then rapidly cooled by submersion in cold water, with the result that the contained solution reabsorbs ammonia gas, thus decreasing the pressure in the second vessel, and causing the liquefied gas to vaporize rapidly with the production of intense cold. Water may also be employed in both systems, but the other substances mentioned above can only be used in compression machines. Condensed air is adopted in the Windhausen apparatus. In this the air is compressed in a cylinder by a piston driven by a steam engine. The air may be compressed to two-fifths of its original bulk, and in this case if the air on entering is at 80° Fahr. compression will raise its temperature to 205°. Leaving the compression cylinder the condensed air passes through several chambers in which by means of a current of cold water the condensed air is brought nearly to its original temperature. In this condition it enters another cylinder where expansion takes place under a gradually diminishing pressure regulated by automatic valves worked by the expansive force of the air itself. In order to re-expand to its normal volume, the air requires to expend as much heat as it gained in condensing. As the heat so gained has been withdrawn in the previous operations it must be drawn from the surrounding media. In this way a great amount of cold is developed, so that when the air issues from the expansion cylinder it may have a temperature as low as 35 below zero Fahr., or even lower. It is accordingly capable of freezing a large quantity of water. Refrigerating apparatus are now common in ships, both to supply fresh provisions for those on board, and also to preserve meat, &c., as cargo.

REFUGE, CITIES OF. See CITIES OF REFUGE.

REFUGEES. This name is given particularly to the French Protestants who fled from their native country on account of the persecutions to which they were exposed after the repeal, in 1685, of the Edict of Nantes, under which the reformed doctrines had enjoyed toleration from the year 1598. (See articles HUGUENOTS and LOUIS XIV.) The cruelties which inquisitorial zeal had produced in other countries were renewed in France against the heretics, as

they were called. Dragoons were quartered on them, and were to compel them by oppressions of every description to renounce their faith, and those who could not be made to recant either died under the sabre, or were obliged to pass their lives in prison, or in banishment beyond the sea. To escape this state of misery many fled from their native land. But the government did all which they could to deprive them of this means of escape. The frontiers of France were occupied by troops, and every Protestant who fell into their hands was abused, deprived of his property, loaded with chains, and confined in the galleys with the most abandoned criminals, children were taken from their parents, and educated in monasteries in the Catholic faith. Nevertheless 800,000 Protestants, at least, were able by artifice, and in some cases by force, to escape from their native country. England, Denmark, Holland, Switzerland, Germany, in the latter especially Saxony, Brandenburg, and Hesse, received these fugitives with hospitality. Merchants and manufacturers went to England and Holland, whither they could more easily convey their property, and at the same time employ it more profitably. The nobility, soldiers, artists, literati, mechanics, and manufacturers went to the states of Brandenburg. In many of these countries the governments gave to the emigrants equal privileges with their other subjects, and received large additions to their resources from the wealth and skill which a fanatical king had driven from his own kingdom. In the Brandenburg states, where these refugees obtained the most extensive civil privileges, they became the founders of a large part of the manufactures which at the present time constitute so considerable a part of the wealth of the Prussian monarchy. They exerted a still more important influence on the intellectual and moral culture of the countries to which they fled. Concerning the reception of the fugitive French Protestants in the electoral states of Brandenburg, see the *Denkwürdigkeiten* of Christian Wilhelm von Dohm (fifth vol., 475).

REGALIA (*jura regalia*), in general, the privileges connected with the sovereign power. They are either such as necessarily originate in the functions of government, or such as are by particular usage or usurpation attached to the sovereign. As states and governments have gradually grown up from rudeness and lawlessness it may easily be imagined how much ignorance, in some cases, and force in others, have influenced the idea of regalia. Among some German tribes the precious metals and stones were considered as belonging exclusively to the sovereign, and even now a citizen has not in all countries the right to work mines on his own ground. Some tribes allowed their princes the sole privilege of hunting all the larger animals, except animals of prey, some sovereigns declared all unclaimed property, as waifs, estrays, newly formed land on the seashore, &c., regalia. Regalia are legally distinguished as *majora* (comprehending what relates to the sovereign's power and dignity) and *minora* (what relates to his fiscal or pecuniary prerogatives). English civilians reckon six classes of regalia: power of judicature, of life and death, of war and peace, of waifs, estrays, and unowned goods, of assessments, and of coining.

Regalia also denotes in Britain the regal insignia, consisting of the crown, the sceptre with the cross, the verge or rod with the dove, St Edward's staff, four several swords, the globe, the orb with the cross, and other articles used at the coronation. The present regalia were made at the restoration of Charles II. The regalia of Scotland consist of crown, sceptre, and sword of state. They are now under the

charge of the officers of state for Scotland, and are exhibited to the public in the crown-room in Edinburgh Castle.

REGATTA, originally a gondola race held annually with great pomp in Venice on the canals intersecting the city. The term is now popularly employed in Great Britain and other countries to signify a showy sailing or rowing race, in which a number of yachts or boats contend for prizes.

REGELATION, the name given to a phenomenon observed by Faraday in 1850, namely, that two pieces of moist ice placed in contact will freeze together, even in a warm atmosphere. It is proved that besides the pressure from the weight of the upper piece of ice there is atmospheric pressure holding the two pieces together; this pressure melts the ice at the parts which bear on one another, and thus enough heat is absorbed to produce regelation. Professor Thomson's discovery, that the freezing point is lowered by pressure, explains the motions of glaciers and the apparent plasticity of ice under pressure.

REGENERATION, in theology, is the equivalent used by the English translators of the Bible for the Greek word *palingenesis*, which occurs only twice in the New Testament, in Matt. xix. 28 and in Titus iii. 5. In the former passage the term is applied generally to the gospel dispensation as a process of renovation, in the latter it is used as descriptive of the process of individual salvation. An equivalent term is used in 1 Peter i. 3, where it is translated 'begotten us again,' and in one or two other passages regeneration, as a theological term, refers to the doctrine of a change effected upon men by divine grace, in order to fit them for being partakers of the divine favour, and for being admitted into the kingdom of heaven. This doctrine is founded not only on the passages already mentioned, but on numerous other passages in the Gospels, the epistles of Paul, Peter, James, and John, and the Acts of the Apostles, where the same change is spoken of in different terms, as well as on analogies drawn from the Old Testament. Without distinguishing other shades of opinion, there are two theories of the doctrine of regeneration which stand in distinct antagonism to one another, the theory of baptismal regeneration and the evangelical theory. The former associates regeneration inseparably with baptism, so that all who are duly baptized by properly authorized ministrants of the rite are regenerated, the latter makes regeneration depend only upon faith in the gospel, without the concurrence of any outward rite. There are several points on which those who hold these two theories are agreed. They agree generally in regard to the passages on which they found the doctrine of regeneration. One of the most important of these is John iii. In many other passages the terms born and begotten again, the former of which is sometimes substituted in our translation for the latter, are used with the same signification. The holders of the baptismal and evangelical theories also agree on the correlation between the doctrines of regeneration and the fall of man. This correlation, it may be observed, is the cause of the most important differences as to the intrinsic meaning of regeneration, for according to the view taken of the fall of man will be that of his restoration. The holders of these two theories are also agreed as to the antiquity, at least, of one of them, for it is generally admitted that the doctrine of baptismal regeneration was held by some of the fathers of the early church, and in particular by Augustine, but while the advocates of this doctrine maintain that it was the universal doctrine of the primitive church, their opponents hold it to have been merely the error of some of the earlier theologians.

The doctrine of baptismal regeneration is founded on various passages, in which explicit reference is made to regeneration as associated with baptism. In the passage already cited, Titus iii 5, baptism is evidently referred to as 'the laver of regeneration.' In John iii. begetting of the Spirit is associated with begetting of water, and there are various other passages where the same association is made or implied without any reservation. The opponents of baptismal regeneration rely on a larger induction as to the general spirit of the teaching of Scripture on this subject, from which they infer that baptism is used merely as the symbol of regeneration, and not as necessarily implying the thing itself. They appeal to experience in proof that all who are baptized do not display the fruits of regeneration, and they also point to the circumstance that the association of baptism with regeneration, or the new birth, is only occasional and partial, thus, in John iii 6, when the new birth is first spoken of it is not associated with baptism. The statement in 1 Peter iii 21 is also held to be an explanation in an evangelical sense of the association between baptism and regeneration.

REGENSBURG See RATISBON

REGENT, in a general sense, is a ruler, the ruler of a state, in a more limited sense, one who exercises the highest power vicariously during the absence or incapacity of the lawful sovereign. The right to the regency is created by law, agreement, or by last will and testament. By a testamentary appointment a ruler can legally establish a regency only when the right of a third person to the regency, founded upon law, is not injured. Regencies have often proved calamitous, both in ancient and modern times, to the people who have had the misfortune to be subjected to them, and have often brought a nation from a prosperous condition to the brink of ruin. It is in fact one of the strongest objections to a monarchy, in which the head of the state possesses much personal power, that the succession is either liable to provoke disputes, or, if regulated strictly by primogeniture, is liable to entail long minorities. In a well established constitutional monarchy no such danger occurs. There are also a few instances in history of regencies ably administered. The common title of a regent in England up to the time of Cromwell was lord protector. The nomination of a regent or council of regency was sometimes made by the king in anticipation of a minority. After the demise of the king the nomination was sometimes made by the Great Council, which sometimes set aside the authority of the king's will. A more legitimate authority, Parliament, denied the right either of king or council to appoint, and finally succeeded in establishing its own. On the death of Henry V Parliament denied the right of the king to appoint a regency for the minority of his successor. The Parliament of Henry VIII conceded to him the right of appointing a regency, and he devolved it upon an executive council, who chose the Earl of Hertford, afterwards Duke of Somerset, to that office. When George III became mentally incapacitated a discussion arose in Parliament, as to whether the Prince of Wales, who was of full age, had a legal right to the regency, or whether the appointment should rest with Parliament. The regency was conferred by Parliament on the Prince of Wales, but at first with certain restrictions. A regency bill was passed in 1830, which did not come into operation, and in 1840 the regency, in the event of the demise of Queen Victoria during the minority of the next heir, was conferred by Parliament on the prince consort.

REGENT, or REGENT MASTER, a term borrowed by the English universities from the University of Paris. Graduates of that university were, according

to ancient usage, bound within a certain period after receiving their degree to deliver public lectures, and received the title of regents. The same custom was introduced into Oxford and Cambridge, but was subsequently superseded by the appointment of regular professors.

REGENT BIRD, or KING HONEY-EATER (*Sericulus chrysocephalus*), a species of Insectorial Birds belonging to the Dendrocygnae, and to the sub-family of the Oriolidae or Orioles. This bird inhabits Australia, and derives its familiar names from the yellow or golden colour of the head. These forms are amongst the most beautiful of the birds of that country. The males possess the most brilliant plumage, this being of glossy satin like texture and of black and yellow colours, which exhibit lustrous hues. The females are dingy in appearance when compared with the males. The name Honey eater has been given to these birds from the tip of their tongue being furnished with a pencil of filaments such as are seen in the ordinary Honey-eaters (which see) or *Meliphaga*, with which group, indeed, the Regent Birds by some authorities have been classified. The true Honey eaters, however, belong to the Tenuirostres, and not to the Dendrocygnae group of the Insectoria. The Regent Birds are of very shy habits, and live in the warmer parts of Australia, inhabiting the forest depths. The food consists of fruits and seeds principally.

REGENT'S PARK, situated in the north west of London, in the parishes of Marylebone and St Pancras, comprises 450 acres. In the reign of Elizabeth the site was occupied by a royal hunting ground, called Marylebone Park. The present name of the park, like that of Regent Street, is derived from the office of regent, held by George IV when he was Prince of Wales, during which period it was planned, although it was only opened to the public in 1838. A considerable portion of the ground is occupied by the Zoological Gardens which are situated in the northern portion of the park, and the Royal Botanic Gardens, which occupy a circular area in the southern half. The park was laid out by John Nash, and although its size gave great opportunities, and its trees and ornamental water are features of beauty, its style is not commended by critics.

REGGIO DI CALABRIA (anciently, *Rhegium Julia*), a seaport town of South Italy, capital of a province of the same name, in a fertile plain, on the east coast of the Strait, and 7 miles south east of the town of Messina. The old town was almost entirely destroyed by the great earthquake of 1783, and a new town has gradually risen up, built on a regular and uniform plan, with good houses and spacious streets, extending from the sea to the hills that rise behind. The principal edifices are the cathedral (a seventeenth century basilica), a collegiate and other churches, a royal college, an ordinary and a founding hospital, a communal museum, and the old castle. It has manufactures of silk goods, linen, common pottery, essences, and other sorts of perfumes, stockings and gloves made of the filaments of the Pinna, a marine bivalve, a considerable trade in oil and silk, and an active fishery. Reggio is the seat of an archbishop, and of a high criminal and civil court. The city was anciently called Rhegium, and was founded at an early date by Greek colonists from Euboea, but it first attained wealth and importance through the settlement of a body of Messenians in 723 B.C. After it had risen to great importance it was besieged and starved into an unconditional surrender by Dionysius the Elder, tyrant of Syracuse who carried off most of its inhabitants as slaves, 387 B.C. It ultimately fell under the Roman yoke, and became a municipal town. Julius Cæsar did much for

its improvement, and hence it became known as Rhegium Julii. It was captured and burned by Alaric in 410 A.D., in 918 it fell into the hands of the Saracens, in 1080 Robert Guiscard became its master, and in 1282 it passed to Peter III of Aragon. In later times it suffered severely at the hands of the Turks and other conquerors. Its last great calamity was the earthquake of 1783, which made it almost a complete ruin. Pop. of commune (1901), 44,417, of town proper about 24,000. The province, formerly called Calabria Ulteriore I, occupies the south western extremity or toe of Italy, and is a rugged and mountainous region. The area is 1221 square miles, the pop. (1901) 430,079.

REGGIO NELL'EMILIA (anciently, *Regium Lepidi*), a town in North Italy, capital of the province of same name, 15 miles WNW Modena, in a beautiful country, near the left bank of the small river Crostolo, and on the canal of Tassone. It is surrounded by ramparts and walls, is well built, has regular streets, several of them lined with porticoes and many handsome houses, among the chief streets being the old Via Emilia, the Corso Garibaldi, and the Corso Vittorio Emanuele. It is the see of a bishop and has an ancient cathedral adorned with marble columns, and several fine statues by Clementi, several other churches, among which that of Madonna della Ghiara, in the form of a Greek cross, and adorned with numerous frescoes, is considered the chief ornament of the town, a handsome town house, lyceum, museum, library, fine municipal theatre, manufactures of linen and silk goods, and of articles in horn, bone, and ivory. Reggio is the birthplace of Ariosto and of the naturalist Spallanzani, whose natural history collection is contained in the museum. The library contains over 70,000 volumes. A favourite excursion from Reggio is to the old castle of Canossa (which see). Communal pop. (1901), 59,176, that of the town proper about 25,000.—The province of Reggio lies between those of Parma on the west and Modena on the east. Its south-west portion is covered by the Apennines and their offshoots, its north-west is flat, and is partly bounded by the Po. The area is 876 square miles, pop. (1901), 275,827.

REGILLUS, LAKE, a small lake believed to have existed in ancient Italy, in Latium, somewhere to the east or south-east of Rome, but of which the site is not quite certain, as it must have long ago been drained or dried up. It is celebrated for the great battle fought here between the Romans and Latins in B.C. 496, which is one of the chief events in Roman legendary history. Livy describes the lake as being in the territory of Tusculum. Gell conjectures that it was at a place called Cornufelle, at the foot of the hill on which stands the town of Frascati. This place is the site of a volcanic crater, about half a mile in diameter, and formerly filled with water, but artificially drained in the seventeenth century. The Latins, who had espoused the cause of the dethroned and banished Roman king Tarquinius Superbus, were defeated after a fierce and bloody contest in which the gods Castor and Pollux took part on the side of Rome.

REGIMENT, one of the divisions of a modern army. Regiments appear to have originated with modern standing armies. They are mentioned in France in 1562, and in England in 1588. The regiment may be considered as the unit of organization of a modern army. The various parts which compose it are never permanently separate, except in the artillery, which is organized in an anomalous way, and no larger body of soldiers is ever permanently united under a single officer. An army is made up of a greater or smaller number of regiments,

according to the importance of the service it has to perform, and the force at the command of the military authority. As the size of regiments varies an army is tactically divided not into regiments but into battalions, a regiment may contain one or more battalions, the strength of which varies in peace and war (See BATTALION, and for the officers commanding a regiment, see OFFICERS MILITARY AND NAVAL.) In time of peace a regiment is commonly reduced in numbers, and contains the skeleton, or *cadre* as the French call it, of the organization of a much larger number of men than actually compose it. The regiments in the British service, as well as in Continental armies, have distinctive colours and insignia, they are inspired by an *esprit de corps*, and carefully cherish the memory of the great actions in which they have participated, of which each regiment forms for itself a special record. Thus, a regiment may have a great history though none of the men actually composing it have seen service. The suggestive names thus borne on the banners of a regiment, and the traditions associated with them, are not without substantial influence on the behaviour of men. The merest recruit feels that he has the honour of his regiment to sustain, and thus the rawest levies have often been inspired with the feelings, and consequently with some of the most valuable qualities, of veterans.

REGIMENTAL SCHOOLS are state supported schools maintained in each regiment for the education of soldiers and their children. The schools in the British army are for both sexes, under a school master and schoolmistress, attendance is optional. Religious instruction is given weekly on Monday, but children attending the school are not obliged to be present at it. There is an industrial section in the girls' school for needlework, &c.

REGIOMONTANUS, a German astronomer, whose real name was Johann Müller, and who, according to the custom of his time, assumed that of Regiomontanus, in allusion to the place of his birth, Königsberg (King's Mountain) in Franconia, was born in 1436. He exhibited great precocity of talent, and having received a classical education at Leipzig, placed himself under Purbachius (Peurbach), the professor of mathematics at Vienna. Under so able an instructor he made the greatest progress, and became one of the first astronomers of that age. Regiomontanus, together with Purbachius, accompanied Cardinal Bessarion to Rome in 1461, where Bessarion gave him further instruction in Greek literature, and he now completed a new abridgement in Latin of the *Almagest* of Ptolemy (Venice, 1496), correcting many errors in the former translation, made by George of Trebizond. In 1471 he built an observatory at Nurnberg, and established a press, but after a stay of little more than three years returned to Rome on the invitation of Sixtus IV., who employed him in the reformation of the calendar, and rewarded his services by raising him to the bishopric of Ratisbon. He died in 1476, according to some of the plague, according to others by poison administered by the son of George of Trebizond, out of revenge for his having exposed the errors of his father. Regiomontanus was the first in Germany to apply himself to the cultivation of the neglected science of algebra. He made great improvements in trigonometry, into which he introduced the use of tangents. His refutation of a supposed discovery of the quadrature of the circle, and his numerous writings on various subjects of natural philosophy, display extensive learning and great acuteness. His astronomical observations from 1475 to 1506 (under the title *Ephemerides*) are very accurate. Among his other works are *De Triangulis Planis et Sphaericis*, *Kalendarium*, *Tabulae direc-*

tionum projectionumque in nativitatibus multum utiles, &c.

REGISTRATION OF SHIPPING See SHIPS (REGISTRATION OF)

REGISTRATION OF BIRTHS, DEATHS, AND MARRIAGES Parish registers of baptisms, marriages, and burials were instituted by Lord Cromwell (afterwards Earl of Essex) while he was vicar-general to Henry VIII. Parish registers were subsequently regulated by various acts of Parliament, but a more efficient system of registration had long been felt to be urgently wanted for many purposes, and in particular for supplying accurate statistical information which might be available for the study of questions of social and political economy. In these circumstances a select committee of the House of Commons was appointed to investigate the subject in 1834, and a bill was brought in the following session, which passed August 17, 1836, and is known as the Registration Act. It is applicable only to England and Wales. This act was amended by subsequent acts, the most recent of which is dated 7th August, 1874, and came into operation 1st January, 1875. It only affects the registration of births and deaths. For properly carrying out the registration of births, marriages, and deaths a general registry office has been established in London, with a registrar general at the head of the whole system, while the whole of England and Wales has been divided into registration districts and sub districts, with superintendent registrars and registrars. The superintendent registrars' districts are usually co extensive with the poor law union of the same name. A sub district generally extends over a certain number of parishes or townships. When a birth takes place it is the duty of the father and mother, and in default of them of the occupier of the house in which the child is born, and of each person present at the birth, to give the necessary information to the registrar within forty two days of the birth. In registering a birth the day on which the child was born must be given, the name (if any), the sex, the name and surname of the father, the name and maiden surname of the mother, the rank or calling of the father, the signature, description, and residence of the informant, the date of registration, and the signature of the registrar. The name of the child may be registered any time within twelve months, on minister's certificate if baptized, or guardian's if not. When the birth is not duly registered the registrar may by a written notice, after the end of forty two days, call upon any of the persons who ought to furnish information regarding the birth to attend personally and give him the necessary particulars of the birth. It is the duty of the registrar to inform himself of every birth that happens within his sub district, and on receiving the required information within three months from the birth to register the same without fee, unless he is sent for by written requisition to receive the information, when he is entitled to a fee of 1s. Registration of birth after three months must be made in the presence of the superintendent registrar, and after twelve months the written authority of the registrar general is necessary. In the former case the superintendent registrar and registrar are entitled to a fee of 2s 6d each, in the latter of 5s each, to be paid by informant. Violation of the law regarding the registration of births after three months renders the party liable to a penalty of not more than £10. The father of an illegitimate child is not required to give any information with regard to its birth, and the father's name is not to be entered in the register unless at the joint request of the father and mother.

With regard to the registration of marriages, when they are solemnized in any Established church the

officiating clergyman is required to fill up a register of prescribed form, marriage register books being supplied to ministers by the registrar-general. These registers are kept in duplicate, one copy being sent to the superintendent registrar. The particulars which must be given are the date of the marriage, the name and surname of each of the parties, whether minors or not, whether married previously or not, rank, profession, or calling, residence at the time of marriage, name, surname, and rank or profession of the father of each of the parties. Marriages that do not take place in Established churches must also be registered either by the district registrar, or by some other duly authorized person.

Deaths are registered much in the same way as births and marriages, the name, sex, age, profession, cause of death, &c., being stated according to a prescribed form. Within five days of the death the necessary particulars must be furnished to the registrar by the nearest relatives of the deceased present at the death, or during the last illness of the deceased, or by any other relative dwelling in the same sub-district as the deceased, or by some person who was present at the death, or by the occupier of the house, &c. If a written notice of the death and a medical certificate of the cause are sent to the registrar the full information may be given within fourteen days instead of five. If the registrar receives no information regarding the death he may, after fourteen days and within twelve months, send a written notice to the proper person, requiring him to appear before him and give the requisite information. After twelve months the written permission of the registrar-general is necessary to the registration of a death, and in this case the superintendent registrar and the registrar each receive a fee of 5s. Any person who registers or causes to be registered any death in contravention of this enactment is liable to a penalty not exceeding £10.

The Irish system of registration of births, deaths, and marriages was introduced 1st January, 1864. It is not very different from that of England, but the giving of information to the registrars is compulsory, though no penalty is enforced unless the neglect be wilful. The presence of a registrar at marriages is not necessary.

The Scotch system was introduced by the act of 7th August, 1854, which provides for the appointment of a registrar general, and the establishment of a uniform system of registering births, deaths, and marriages in Scotland. The provisions for the formation of districts and the appointment of local registrars are in general similar to those of the English act. The giving of information is made obligatory. The registrar may on application to the sheriff compel attendance of parties necessary to give information for a registration, and recover costs of the application from the person failing to attend. Penalties are also imposed for neglecting or refusing to give information.

REGISTRATION OF DEEDS (Scotland) The registration of deeds and writs is conducted in the administration of Scotch law on a very complete and comprehensive system. The public registers are kept in the General Register House in Edinburgh, under the direction of the lord clerk register, assisted by a deputy and two sets of officers, the one for forming the records, the other for their safe custody. In these are kept a record of all sasines, entails, interdictions, adjudications, inhibitions, and inventories affecting property, which are open to the public for consultation on payment of fees, so that the state of any property can be accurately ascertained by any one interested in it. The general register office has absorbed all the local registers, except those of burghs, which are kept on the same plan. The registration

custom in preparing deeds to insert a special clause of registration, by means of which immediate execution is secured in the event of non compliance with the obligation of the deed. The registration under the act of 1698 is a registration for preservation merely.

REGISTRATION OF ELECTORS (Parliamentary) was first established by the Reform Act of 1832, in terms of which, in England, the overseers of each parish were required to draw up a register of all persons qualified to vote. This still forms the basis of procedure, but the law has been frequently altered, the latest act on the subject being the Registration Act of 1885. The overseers of the parish have now to publish yearly, on the 1st August, a list of the qualified voters, and those persons not on the list must apply to have their names inserted before the 20th August. Any person on the register may object to any person on this list, but he must give notice to this effect to the overseers and to the person objected to. Copies of the amended list are transmitted to the revising barrister, who makes a circuit, holds an open court, takes evidence on oath, hears claims and objections, and decides to omit or insert the names of the applicants. An appeal from his decision can be laid before the King's Bench Division of the High Court. The list of voters being thus settled, it is printed and handed to the returning officer. In Scotland the register of voters is drawn up by assessors, aided in burghs by the town clerks, and the duties connected with revision are discharged by the sheriff of the county. In Ireland the clerks of poor law unions have charge of the registers, revision is made before assistant barristers at a special session, and the completed register is placed in the hands of the sheriff in a county, and the returning officer in boroughs.

REGISTRATION OF SHIPPING. See **SHIPS**.

REGIUM DONUM, an annual grant made in the name of the crown to the Presbyterian clergy of Ireland. It began under Charles II. in 1672, was renewed by William III., and subsequently augmented, until a considerable part of the means of support of the Presbyterian clergy was drawn from it. It latterly amounted to about £40,500. The grant was withdrawn by the act of 1869 disestablishing the Irish Church, which came into force in 1871, a slump sum of £575,170 being given instead. From 1723 to 1851 the Presbyterian, Independent, and Baptist ministers in England were also in receipt of Regium Donum.

REGIUS PROFESSORS, professors at Oxford and Cambridge whose chairs were founded by Henry VIII. The name is also given to professors in other universities who receive their appointments from the crown.

REGNAL YEARS, the years a sovereign has reigned, numbered successively, and used for chronological purposes, as in the enumeration of acts of parliament. The practice of dating a new reign from the day following the last of the late king's reign has generally been adopted since the reign of Richard II., but before this time a reign was generally considered to begin with some act of sovereignty.

REGULAR CLERGY, the term applied in the Roman Catholic Church to ordained persons belonging to a religious order or congregation, and living under vows of obedience to an established rule, in opposition to the secular or parochial clergy.

REGULATOR OF A WATCH, the small spring belonging to the balance. See **WATCH**.

REGULUS, a metal reduced from one of its compounds by fusion with a reducing agent, also, in modern metallurgy, the product obtained by the smelting of ores of copper, lead, and other metals.

REGULUS, MARCUS ATILIUS, a Roman general celebrated for his patriotism and devotion in the service of his country, was made consul a second time about 256 B.C. and with his colleague, Manlius Vulso commanded in the first war against Carthage. Notwithstanding the little experience which the Romans then had in naval warfare, the consuls defeated a superior Carthaginian fleet, and effected a landing in Africa. Here Regulus followed up his victories so successfully that in a short time he presented himself before the capital of the enemy Carthage, deprived of her fleet defeated in the military operations by land and exposed to a revolt of the Numidians, sued for peace. Regulus, more of a soldier than a politician, persisted with the Roman haughtiness in his demand of unconditional submission. The Carthaginians preferred to die rather than to accept such terms, and at this juncture were joined by a small body of Spartan volunteers under Zanthippus. The Grecian general, having been intrusted with the command of the Carthaginian forces, gave battle to Regulus under the walls of Carthage, where 30,000 Romans fell, and Regulus was made prisoner, B.C. 255. He remained in Carthage till B.C. 250, when the Carthaginians, having been defeated by the Proconsul Metellus, were desirous of peace. An embassy was therefore sent to Rome, accompanied by Regulus, who was obliged to bind himself by an oath to return to Carthage if Rome should refuse the terms proposed. Regulus, however, considered it his duty, in opposition to the wishes of the Carthaginians, to advise the continuance of the war, and neither the prayers and tears of his wife and children, nor the entreaties of the senate and people, who were ready to save the liberty and life of such a citizen by any sacrifice, could bend him from his purpose. The prosecution of the war was therefore decided upon, and the Carthaginian ambassadors returned home as tomahawked and irritated, and with them Regulus, in obedience to his oath. It is related that he was put to death with great cruelty, and that Humbar and Boscar, two noble Carthaginian prisoners, were given up to the family of Regulus, who took revenge on them in a similar manner. The story of Regulus, one of the chief embellishments of Roman history, has been much questioned by modern critics. It is not mentioned by Polybius. Some modern authorities, however, defend the popular account, and others are disposed to receive it with some deduction of the details of cruelty ascribed to the Carthaginians. The opinion that the story was invented to excuse the cruelty of the family of Regulus to their prisoners has, on the other hand, been adopted by many modern critics.

REICHARDT, JOHANN FRIEDRICH, a German musical composer and author, who was born at Königsberg in 1752, studied in the University of Königsberg, under Kant, and afterwards at Leipzig, travelled much, was appointed in 1775 musical superintendent for the Italian opera in Berlin, did a great deal for music under the reign of Frederick William II., was appointed court director in Cassel in 1807 by the King of Westphalia, and died near Halle in 1814. His compositions are very numerous, among which are the *Tamclanc of Morel* and the *Panthea of Berquin*. Some of his lighter productions are very fine. His literary productions are *Familiar Letters*, written during a Journey in France in 1792 (two vols 8vo), *New Familiar Letters*, during a Journey in France in 1803 and 1804 (three vols 8vo), *Familiar Letters on Vienna, &c.*, *Napoleon Bonaparte and the French People under his Consulate, &c.* In 1804 and 1805 he was conductor of the *Musical Gazette* of Berlin.

REICHENBACH, a town of Prussia, in the province of Silesia, in the government and 80 miles south west of Breslau, on the right bank of the Peile. It is a thriving industrial town in a district where the cotton manufacture flourishes, and has several courts and offices, Protestant and Roman Catholic churches, a new town house, extensive cotton manufactures and other works, as well as a good general trade Pop (1900), 24,498

REICHENBACH, a town of Saxony, in the circle and 7 miles south east of Zwickau. It has manufactures of woollen, linen and cotton goods, hosiery, and stoneware, worsted, flax, and cotton mills, dye works and bleachfields, and a considerable trade. Bottiger the antiquary was born here. Pop (1885), 18,330, (1895), 24,415

REICHENBACH, CHARLES, BARON VON, a German naturalist, born Feb 12, 1788, at Stuttgart. He studied at Tübingen, where he obtained the degree of Doctor of Philosophy. Carried away by a lively imagination he conceived at the age of sixteen the idea of founding a new German state in the islands of the South Sea. He pursued this plan for three years, after which he began to turn his attention to scientific and industrial pursuits. He visited the principal public works in France and Germany, and established works of his own at Villingen and Hausach in Baden. In 1821 he founded, in conjunction with Count Hugo Salm, a number of industrial establishments in Moravia, from which he realized a considerable fortune, and was enabled to purchase the estates of Gutenbrunn, Nisko, Reisenberg, &c. It was at this time that the king of Württemberg raised him to the dignity of baron. In 1834 he published in Vienna *Mittheilungen aus Mahren*, the first geological monograph which appeared in Austria. He is also credited with some chemical discoveries, in particular of paraffin and krenote. In the course of his studies of animal magnetism he believed he had discovered a new force, which he called *od* (see *Od*), upon which he published several works, as *Physikalisch physiologische Untersuchung über die Dynamide des Magnetismus* (second edition, three vols., Brunswick, 1849), *Odisch magnetische Briefe* (Stuttgart, 1852), *Der sensitive Mensch und sein Verhalten zum Od* (two vols., Stuttgart, 1854), *Wer ist sensitiv, wer nicht?* (Brunswick, 1856). *Od* manifested itself as a vacillating light, but only to persons who are *sensitive* to its influence. It has the curious effect of making those who are susceptible of it entertain unaccountable attractions and repulsions for each other, and this has sufficed to make some imaginative persons believers in it. Baron Reichenbach's latest works were *Kohlerglaube*, and *Afterwissenschaft*, in reply to Karl Vogt (1856), *Aphorismen über Sensibilität und Od* (1866), *Die Odische Lohe* (1867). He died at Leipzig on 19th January, 1869.

REICHENBERG, a town of Bohemia, on the Neisse, 56 miles N.N.W. of Prag. It is generally well built, and among its buildings and institutions are an archidiaconal church of the fourteenth century (restored), another old and several new churches, a synagogue, an old palace, new town hall (1892), town theatre, new Ursuline convent (1896), hospitals, schools and colleges, &c. Woollen cloths are extensively manufactured in the town and neighbourhood, and among numerous other industries the manufacture of carpets, woollen goods, and machinery, as well as brewing and malting, are important. Pop (1900), 34,099.

REICHENHALL, a town of Upper Bavaria, in a wide and beautiful valley, 65 miles south east of Munich, on the right bank of the Saal, here crossed by two bridges. It has four churches, a town-house, and hospital, and one of the most important salt-works in the kingdom. The salt is obtained from thirty

springs, and the annual produce averages 12,000 tons. In 1817, after great expense, and by the genius of the celebrated engineer Reichenbach, these springs were brought into connection with those of Traunstein and Rosenberg and the salt mines of Berchtesgaden by a conduit carried above 50 miles over hills and valleys. Pop (1895), 4193.

REICHSTADT, DUKE OF. See **NAPOLEON II**.

REID, THOMAS, D.D., philosopher, was born on 26th April, 1710, at Strachan, in Kincardineshire, of a family several of whose members had acquired literary distinction. His father, the Rev Lewis Reid, was minister of Strachan, his mother was the niece of James Gregory, the inventor of the reflecting telescope. After two years at the parish school of Kincardine O'Neil he was sent in 1722 to Marischal College, Aberdeen. Two reminiscences of his college career which he has left on record are probably not uncommon at his time of life. He was addicted to day dreaming and afflicted with nightmare. Reid mentions that in his day-dreams he was very courageous and performed all manner of imaginary exploits, while in his sleep he was an arrant coward and entirely without resource in danger. He cured himself of nightmare at length by repeatedly impressing on his mind when awake that it was only a dream, till he got to recollect this in his sleep, and his horrors gradually disappeared. He graduated in 1726, and after studying divinity was licensed to preach in 1731. Two years later he was appointed to the librarianship of Marischal College, a post which had been endowed by one of his collateral ancestors. In 1736 he visited England in company with John Stewart, professor of mathematics in Marischal College. Their tour included London, Oxford, and Cambridge. In 1737 he was presented to the living of New Machar in Aberdeenshire. He was appointed, according to the existing law, by the patron of the parish, but the popular hatred of patronage occasioned a violent opposition to his settlement, in which even his life appears to have been in some danger. His devotion to his duties soon completely reconciled his parishioners to their pastor. He adopted for at least a considerable part of the time he was at New Machar a practice which has never been usual in Scotland, and which has rarely won the approbation of a Scotch congregation—that of reading published sermons (those of Tillotson and Evans) instead of preaching his own. In 1740 he married his cousin, Elizabeth Reid. About this time he is supposed to have been engaged in philosophical investigations and in observations upon the organs of sense, but he exhibited no signs of precocious genius, and his early compositions are said to have been deficient in accuracy. His first public attempt at philosophical discussion was an *Essay on Quantity*, published in the *Transactions of the Royal Society* in 1748. It was directed against an application of the moral philosophy of Hutcheson, in which mathematical terms are employed to measure virtue and merit. The particular opponent attacked in it is not Hutcheson himself, but a Dr M. In 1752 the professors of King's College, Aberdeen, elected Reid professor of moral philosophy in that college. Here a select society of men of literary and philosophical tastes was formed partly by his exertions. In 1764 Reid published his first great philosophical work, *An Inquiry into the Human Mind upon the Principles of Common Sense*. Having directed this work specially against the philosophy of Hume, Reid, before publishing it, was anxious to have the manuscript perused by Hume that any merely verbal misunderstandings between them might be cleared up. He transmitted it for this purpose through Dr Blair. Hume, who had no very high opinion of the polemical powers of the clergy, received it with reluctance, but returned it after perusal in a

letter full of courtesy, in which he expressed a high opinion of its merit. He warmly complimented Reid on the spirit and clearness of his style as well as on the philosophical depth of his treatise, and concluded by saying that if Reid should succeed in clearing up those abstruse and important subjects he should be vain enough to claim a part of the praise for giving coherence to the common errors such as to lead to a stricter review and refutation of them.

In 1785 Reid published his *Essays on the Intellectual Powers of Man*, and in 1788 his *Essays on the Active Powers*. These two works, which are less brilliant in style and less polemical than the *Inquiry*, contain a complete *résumé* of his philosophy. He also composed, as a portion of Lord Kames's *Sketches of the History of Man*, *A Brief Account of Aristotle's Logic*.

In 1764 Reid received the appointment of professor of moral philosophy in the University of Glasgow. This chair was more purely devoted to philosophy than that at Aberdeen, and he prepared a six months' course of lectures extending over five hours a week for it. The pursuits of the town also evoked his interest, and he prepared some essays on topics connected with trade. At the same time he attended Dr Black's lectures on chemistry and revived his study of mathematics. Most of the topics of his lectures to his students are treated much in the same manner in his published works. They embraced, however, besides his philosophical principles, general views of ethics, jurisprudence, and politics, and he delivered an extra course on the topic. His manner of lecturing was devoid of oratorical display, and there appears to have been little of the influence of personal enthusiasm brought to bear on his students, yet according to Dugald Stewart, he succeeded in commanding their attention by the clearness of his exposition and the intrinsic weight of his doctrine. He retired from active teaching in 1780, after which, besides his principal works enumerated above, he communicated a few papers to the Royal Society, including an *Examination of Priestley's Opinions on Matter and Mind*. He died in 1796, having retained the full possession of his faculties almost to the close of his long life.

Reid was the founder of the school of philosophy known distinctively as the Scottish school. In one respect he had predecessors. The philosophy of the Scottish school is truly derived from the traditions of Scottish theology, and the philosophical teaching of the Scottish universities, which from the time of Hutcheson had assumed a systematic form, was in harmony with that theology. But the principles of Locke were received in Scotland without question and without suspicion of any discordance with the Scriptural dogmas, held more sacred than any human reasoning. This confidence was rudely shaken by the sceptical treatise of Hume. The *Treatise of Human Nature* appeared in 1738, and Reid appears to have worked patiently and leisurely at his reply till he had fully measured his opponent and developed his plan of attack. It was not till the appearance of his *Inquiry* (1764) that Locke was suspected of complicity with the principles of Hume, or his supremacy in philosophy questioned. Reid had, however, found Hume logical and sequent, and had had to go beyond him to get at the root of his principles, which he found in Locke. His treatise was thus an attack on the dominant philosophy, and the new point of departure which he assumed became the basis of a new school. The key of Reid's opposition to Locke is to be found in his rejection of the fundamental doctrine of that philosopher that our knowledge is derived entirely from experience, and in the assertion of mind as a factor in the production of knowledge. Reid's fundamental principle of common sense is a somewhat vague and indefinable one, and not much appears to have been

VOL. XII.

made of it by his followers. He seems to have intended by it to decline the task of defining the substance or proving the existence of mind, while he professes to distinguish its powers and illustrate their operation in the acquisition and use of knowledge. In the development of his philosophy Reid has laid himself more open to criticism than most philosophers, inasmuch as it is much less than the majority of philosophical schemes pervaded by the spirit of system. The majority of philosophical systems stand or fall with their fundamental principles. Once admit these and the whole is a logical development from which, unless by the detection of some lurking sophistry, there is no escape. Not so with Reid. He does not limit his first principles. Every power of the mind is with him a distinct reality, and he has only to be satisfied that the mind possesses a new function in order to provide a new category for it. His system is, therefore, not less an experimental one than that of Locke, though the sphere of experience to which he appeals is different. Locke assumes that the mind resembles a sheet of blank paper. He has therefore to study not the mind, but what is put into the mind, in order to account for the phenomena of knowledge. Reid directs his observation to the operations of the mind itself, and thus re-establishes the psychological method of investigation. The value of his system, apart from this, which is really its fundamental principle, depends upon the success of his individual observations in psychology. What serves to render it the more independent in its details is the comparatively limited scholarship of its founder, which precluded him from availing himself fully of the observations of those who had gone before him in the same track. Reid appears to have been but imperfectly acquainted even with Descartes.

The philosophy of Reid has been very variously appreciated by the followers of various schools, and its founder has been regarded with sentiments of almost every shade from veneration to contempt. While he is treated with the utmost respect and admiration by men like Dugald Stewart and Sir William Hamilton, Ferrier finds his name suggestive of emotions of pity, appends to it the epithet 'poor man,' and declares that he had no speculative capacity whatever. Two classes of philosophers in particular, idealists and materialists, are constrained to reject the doctrines of Reid, as he was the direct opponent of both. His philosophy has been called realist because he maintains the doctrine of immediate perception in opposition to that of ideas or images of objects between the mind and the true object or cause of perception. Notwithstanding his antagonism to those different schools Reid has succeeded in founding a school of considerable influence, which in his own country has been graced by names of such eminence as Dugald Stewart, Adam Ferguson, and Sir William Hamilton, and which has been openly recognized as the means of a philosophical revival in France by men equally distinguished, among whom may be mentioned Royer Collard, Victor Cousin, and Jouffroy. Cousin has given an admirable *résumé* of Reid's philosophy in his *Philosophie Ecossaise*, and Jouffroy has translated his works into French—*Œuvres complètes de Th. Reid publiées par Th. Jouffroy avec des fragments de M. Royer-Collard et une introduction de l'éditeur* (six vols 8vo, Paris, 1828). The standard edition of his works is that of Sir W. Hamilton as edited by Mansel. See the *Life* by Dugald Stewart, *M'Cosh's Scottish Philosophy*, *A. Seth's Scottish Philosophy* (new ed., 1899).

REIGATE, a municipal borough of England, in the county of Surrey, 20 miles S. of London. It has a town hall, assembly room, public hall, an ancient church, with an embattled tower and some interest-

ing monuments, modern churches and chapels, a grammar school, a literary institute, &c. Reigate formerly returned a member to Parliament. It is now included in the Reigate parl. division of Surrey Pop. (including Redhill) (1891), 22,846, (1901), 25,993.—**REDHILL**, the eastern part of the borough, is an important railway junction, with market hall, reformatory, technical institute, &c., and has now outstripped Reigate proper.

REIKIAVIK, **REIKIAVIG**, or **REYKJAVIK** (Danish, *Reikevåg*), a seaport town, and capital of the Island of Iceland, on the south west coast, and on a tongue of land which projects into the Faxaflod. It is the see of a bishop, the seat of government, and residence of the principal authorities of the island, and has a cathedral church, a superior grammar school, an observatory, a public library, some manufactures of coarse woollens, a good harbour, at which a considerable trade is carried on, and an important annual fair. Pop. in 1901, 6700.

REIMARUS, **HERMANN SAMUEL**, a German scholar, was born at Hamburg, 22d December, 1694. He was educated chiefly by his father, who was a teacher, and by J. A. Fabricius and Christopher Wolf. About 1714 he studied at Jena, and afterwards at Wittenberg. He made a tour in 1720 through Belgium and a considerable part of England, became in 1723 rector at Wismar, and held in 1727 the professorship of Hebrew in the Gymnasium of Hamburg, which he subsequently united with the professorship of mathematics. He died 1st March, 1765. He edited the works and wrote the life of his father in law, J. A. Fabricius—*De Vita et Scriptis J. Alb. Fabricii commentarius* (1737). The edition of *Dio Cassius*, begun by Fabricius and ended by him, is a monument of philological erudition. To philosophy and natural history he contributed *Die vornehmsten Wahrheiten der natürlichen Religion* (1754), *Beachtungen, über die Kunststriche der Thiere* (1762), and *Vernunftlehre* (1756). In the *Wolfenbüttelschen Fragmenten eines Ungenannten* (published by Lessing in 1777-78) he made an application of the rules laid down in the last mentioned work against the positive doctrines of Christianity. Until published by Lessing it was known only in manuscript to a few of his most intimate friends.

REINDEER. See **DEER**.

REINDEER MOSS (*Lichen rangiferinus*) is a valuable lichen, which grows in great abundance in the north of Europe, particularly in Lapland. It constitutes almost the sole winter food of the reindeer. Linnaeus says it grows so luxuriously in Lapland that it sometimes reaches 1 foot in height. The reindeers scratch it up from under the snow with their feet and antlers. On this plant their existence, as well as that of the Laplanders, to whom they are indispensable, depends. Reindeer moss also grows on the moors and mountains of Britain. Its nutritive properties depend chiefly on the gelatinous or starchy matter of which it is largely composed. Its taste is slightly pungent and acid. When boiled it forms a jelly possessing nutritive and tonic properties.

REINECKE. See **REHARD**.

REINHART, **JOHANN CHRISTIAN**, one of the greatest German landscape painters, born at Hof in 1761, was originally intended for the church, but soon showed a very decided inclination for art. He was educated under Über in Leipzig, and afterwards in the Academy of Dresden. The liberality of his patron, the Margrave of Baureuth, enabled him to visit Rome, where he fixed his residence. His compositions are rich, nobly conceived, and full of poetic beauties. Among the great masters in the same branch he most strongly resembles Swanevelt. Among the most excellent paintings of his later years are

those in the Massini Palace at Rome. He died in 1847.

REINHOLD, **KARL LEONHARD**, born in Vienna, Oct. 26, 1758, was professor of philosophy, first at Jena (from 1787), then at Kiel (from 1794), where he died April 10, 1823. His Catholic parents destined him for the church, and sent him to study with the Jesuits in Vienna. When the order was abolished in 1774 he entered the college of the regulated priests of St. Paul (generally called *Barabites*), where he became, at the age of twenty-two years, professor of philosophy. During the reign of Joseph II he distinguished himself by many philosophical treatises in periodical works. But his vigorous and inquiring mind could not fail to discover the weakness of many Catholic dogmas. He left Austria in 1787, and the same year was appointed professor at Jena, having written a celebrated *Vindication of the Reformation against two chapters in Schmidt's History of the Germans*. Among his other works are *Über das Fundament des philosophischen Wissens* (1791) and *Grundlegung einer Synonymik für den allgemeinen Sprachgebrauch in den Philosophischen Wissenschaften* (1812). In his philosophy he followed Kant, Fichte, Barhi, and Jacobi. Professor Ernest Reinhold, his son, published in 1825, at Jena, his *Life*, with a number of letters addressed to him by Kant, Fichte, and other philosophers.

REINSURANCE, in commerce, a second insurance effected on the same venture. The term is commonly used in regard to marine insurance. Goods may be reinsured by the original insurer to cover the bankruptcy of the underwriters, or by the underwriter to relieve himself of, or rather to cover, the risk taken with the original insurer.

REIS. **LEFFENDI**. See **LEFFENDI**.

REISKE, **JOHANN JAKOB**, a distinguished German philologist, was born at Zeitz in Saxony in 1716. After studying from 1728 to 1732 in the orphan's school at Halle, he went in 1733 to the University of Leipzig, where he did not attend lectures, but studied the Arabic language, devoting to that object all the resources at his command, and in 1738, though entirely destitute, undertook a journey to Leyden, then the seat of Arabic literature. In Hamburg he found two patrons (Wolf, a clergyman, and Professor Reimarus), who enabled him to accomplish his wishes. In Leyden Schultens gave him access to the library, of which he made diligent use. Reiske pursued his philological studies with the greatest zeal, and at the same time attended to theoretical medicine, and received the degree of doctor free of expense from the medical faculty. He returned to Leipzig in 1746, and for the next twelve years gained his subsistence by giving private instructions. In 1758 he was appointed to the rectorship in St. Nicholas School at Leipzig, the duties of which he discharged with fidelity for sixteen years, notwithstanding his numerous literary labours. He died in 1774. Greek literature is indebted to Reiske for excellent editions of Theocritus (Vienna and Leipzig, 1765, two vols. 4to), of the Greek orators (Leipzig, 1770-75, twelve vols.), of Plutarch (Leipzig, 1774-79, twelve vols.), of Dionysius of Halicarnassus (Leipzig, 1774-77, six vols.), and of Maximus Tyrus (Leipzig, 1774, two vols.). Uncommon erudition and critical acuteness are displayed in his *Animadversiones in Græcos Auctores* (Leipzig, 1759-66, six vols.), containing emendations of a great number of passages of the Greek classics. His collection of manuscripts, chiefly Arabic, which he had himself transcribed or purchased, was bought after his death by Suhm of Copenhagen. His *Life*, written by himself with impartiality and frankness, was continued to his death by his wife, and published at Leipzig in 1783.

The excellent *Vita Reiskii* by Morus (Leipzig, 1777) should be compared with it.

RELAPSING FEVER, a fever so called from the fact that during apparent convalescence a relapse of all the symptoms occurs, and this may be repeated more than once. It is also called famine fever, because it has occurred during seasons of destitution since 1739. It is an infectious disease.

The symptoms do not generally show themselves for three or four days after exposure to the contagion. These generally commence with a shivering sensation, headache, and muscular pains all over the body, but especially in the limbs, then the pulse rises, and the temperature increases, there is also great thirst, pain over the stomach, and retching. Sometimes there is intense hunger, and the patient becomes very prostrate. On the fifth or seventh day the symptoms abate, and there is rapid amendment until about the fourteenth or fifteenth day from the commencement of the symptoms, when a relapse occurs. Three or four days afterwards convalescence again commences, and in the majority of cases goes on to complete restoration to health. Relapsing fever is not often fatal, the death rate being about 2 per cent of those attacked. The treatment consists in giving gentle laxatives and cooling drinks, perfect quietness, and a light nutritious diet.

RELATIVE RANK IN THE ARMY AND NAVY. The following is a list of equivalent ranks of combatant officers in the two services of Britain and America—

Army	Navy
Field marshal	Admiral of the Fleet.
General	Admiral
Lieutenant general	Vice admiral
Major general	Rear admiral
Brigadier general	Captain of the Fleet and Commodore (1st and 2d class)
Colonel	Captain over 3 years service
Lieutenant colonel	Do under do
Do (junior)	Comm under
Major	Lieutenant of 8 years standing
Captain	Do under 8 do
First lieutenant	Sub lieutenant
Second lieutenant	Midshipman

RELEASE, in English law, is the name given to a common law conveyance, in which the word 'release' is the operative verb. A release operates in five modes: 1st, by passing an estate, as when a joint tenant or coparcener conveys his estate to his co joint tenant or coparcener, 2d, by transferring a right, as when a disseisor (a person who has been unlawfully dispossessed) discharges his right to the disseisor, 3d, by extinguishment, as the lord releasing his seigniorial rights to his tenant, 4th, by enlarging a particular estate into an estate commensurate with that of the person releasing, 5th, by entry and feoffment, as a disseisor releasing to one of two disseisors, which is equivalent to entry on the property and defeoffment after putting an end to the disseisin.

RELICS. Relic worship, or a special veneration paid to remains of saints and martyrs, and especially to memorials of the life and passion of our Lord, is sanctioned and practised both in the Roman Catholic and Greek Churches. The doctrine of the Roman Catholic Church in regard to relics was fixed by the Council of Trent, which decreed (25th December, 1563) that veneration should be paid to relics as instruments through which God bestows benefits on men. The doctrine in this form has been rejected by all Protestant churches, which found their faith on Scripture exclusively of tradition. These churches neither admit that there is any authority in Scripture for paying veneration to relics, nor any evidence from experience that God uses them as instruments for bestowing benefits on men. In the latter contention they are naturally supported by the adherents of the philosophical creed of Rationalism.

The veneration of relics is not peculiar to Christianity. It is founded on a sentiment or affection natural to the human heart, and has found a place in nearly every form of religion. Even Buddhism, with whose theoretical doctrines it has as little to do as with those of Christianity, is historically remarkable for the extent to which relic worship has been carried in it, the memorials of Sakya muni being treated with a veneration analogous to that bestowed upon those associated with the founder of Christianity.

In the Old Testament Scriptures relic worship is noticed as one of the superstitious practices associated with idolatry, against which the prophets and reforming kings of Israel and Judah were continually at war. A notable instance occurs in 2 Kings xviii 4, where it is mentioned in connection with removing the high places, breaking the images, and cutting down the groves, that Hezekiah 'broke in pieces the brazen serpent that Moses had made for unto those days the children of Israel did burn incense to it and he (or they) called it Nehushtan'. This name is supposed by some critics to have been that by which the Israelites worshipped the brazen serpent, by others a term of contempt (a piece of brass) applied to it by Hezekiah.

The origin of relic worship or veneration in the Christian church is generally associated with the reverence paid by the early Christians to the tombs of the martyrs and to objects associated with their memory. There are very early historical records which attest not only the rise of a sentiment of this kind, but its wide prevalence and its rapid growth to the height of superstition. Whenever this veneration had become not merely an instinctive sentiment by which expression was given to the affliction of those who had been familiar with a particular martyr, but a general principle on which respect was shown to the memory of holy personages, a reflex extension, as well as an onward growth of the practice, became inevitable. Memorials of the earthly life of our Lord, of the apostles and early martyrs, of the Virgin Mary, and of those whose names have been preserved by Scripture or tradition as attendants on our Lord's ministry, would necessarily acquire an inappreciable value. This is what actually happened.

The further progress of relic worship, the superstitions and corruptions associated with it, and its important consequences in the history of the church, are admirably summarized and appreciated by Gibbon in the 28th chapter of the *Decline and Fall*. Gibbon describes the impotent contempt with which the philosophical adherents of the expiring polytheism saw the deities 'who are conceived by the understanding' replaced by the remains of malefactors who had suffered a just and ignominious death, and whose bodies were still 'marked by the impression of the lash and the scars of those tortures which were inflicted by the sentence of the magistrate'.

In the age which followed the conversion of Constantine, says Gibbon, the venerable bones of the apostles were deposited under the altars of Christ, on which the bishops of the royal city continually offered the unbloody sacrifice. About fifty years later the bones of the prophet Samuel were transported to Constantinople. In the age of Ambrose and Jerome something was deemed wanting to the sanctity of a Christian church till it had been consecrated by some portion of holy relics. The introduction of relics led to other practices, which for 1200 years, according to Gibbon, 'corrupted the pure and perfect simplicity of the Christian model'. The rapid extension of the catalogue of saints by religious fiction, which 'insensibly extinguished the light of history and of reason in the Christian

world,' is one point dwelt on by the historian, another is the powerful aid gained in the attestation of relics, and the indefinite series of corrupt motives opened up for the encouragement of their worship among the ignorant and superstitious of all classes by conferring on them the power of working miracles. With this is associated the resource of supernatural visions by which new relics were discovered. The remains of St Stephen, the first martyr, were, as attested by Augustine, revealed in this way by Gamaliel in vision to a presbyter in Jerusalem. These remains performed upwards of seventy miracles within two years within the diocese of Augustine, which was less favoured than other districts. Gibbon tersely observes that a miracle could then scarcely be considered as a deviation from the established laws of nature. An ignoble trade in relics was an early and natural result of these superstitions. This was prohibited by Theodosius in 386. Vigilantius, a presbyter of Barcelona, vainly endeavoured to oppose the tide of abuse about the beginning of the fifth century, for which Jerome regarded him as no better than a heathen. Already the shrines of saints were crowded with worshippers, who presented all manner of petitions for such temporal blessings as were suggested by the miracle-working power, and reliance on a favourite saint soon came to take the place with the superstitious of prudence, honesty, and every other virtue. The most splendid festivals were celebrated in honour of the popular saints in churches, to which pilgrims crowded to salute the veiled relics of their patrons. At length in 787 the second Council of Nicaea declared the possession of relics necessary to the consecration of churches.

The history of relics during the 1200 years from Constantine to the Reformation, referred to by Gibbon, would present only the monotonous picture of a morbid development or aberration of reason associated with moral weakness and degeneracy, of which other illustrations are sufficiently abundant. A feeble attempt was made by Innocent III at the Council of the Lateran in 1215 to put some bounds to a practice the abuse of which had become obvious even to the occupant of the holy see, by prohibiting the veneration of new relics without the approval of the pope, and forbidding them to be sold or exposed outside of the cases or shrines in which they were regularly preserved.

A more important incident in the history of relics took place on the occasion of the renewed intercourse between the Eastern Empire and the Western states, brought about by the Crusades. The worship of relics, having begun before the separation of the Eastern and Western Churches, was a point of agreement between them. The Crusades vastly increased the European wealth in relics through the plunder of the Syrian churches, and even on the Latin conquest of Constantinople of those of the Greek capital itself. A delicate negotiation of this kind was conducted by Baldwin, the Latin emperor of Constantinople. (See Gibbon, chap lxi.) In great need he pledged the crown of thorns which had been worn by Christ before his crucifixion to the Venetians. It was redeemed by Louis IX of France, the saintly monarch giving Baldwin a present of 10,000 silver marks for the concession of the right of redemption. It was a thorn from this crown which subsequently wrought a miraculous cure on the niece of Pascal. (See PORT ROYAL.) Saint Louis bought other valuable relics from Baldwin, and erected La Sainte Chapelle at Paris to receive them.

It is scarcely necessary to add that in the course of degeneracy the articles venerated as relics multiplied beyond measure. Not only did those of which

the supply was necessarily limited, as the wood of the true cross and the relics of apostles and early martyrs, become common and accessible to an astonishing degree, but the most puerile and even ridiculous objects were presented as fitting symbols for veneration from their association with some saint or martyr, and were credited with the most astounding miracles. The detection of false relics thus came to be an object of ecclesiastical attention, and the regulations of 1215 were renewed by the Council of Trent, bishops being required to decide as to the genuine character of what were put forward as new relics, with the aid of theologians and other bishops if necessary. The abuses connected with relics have thus been greatly modified.

RELIEF, in law, a certain sum of money which the tenant, holding by military service, and being of full age at the death of his ancestor, paid to the feudal lord at his entrance on the possession of the estate.

RELIEF. See **BASS RELIEF**.

RELIEVING OFFICER, the officer appointed by the board of guardians of an English poor law union to superintend the relief of the poor in the parish or district. His office is to receive applications for relief, inquire into facts, and ascertain that the case is within the conditions required by law. He has to visit the houses of the applicants in order to pursue his inquiries, and to give immediate relief in urgent cases.

RELIGION (Latin, *religio*, possibly from *religere*, 'to gather again,' or *religare*, 'to bind up,' but the derivation of this word has been held doubtful both in ancient and modern times). Religion in its widest sense signifies the feeling of reverence which men entertain towards a Supreme Being, or to any order of beings conceived by them as demanding reverence from the possession of superhuman control over the powers of nature. Religion is a natural fact. It is not derived from any spontaneous and individual exercise of reason. Its universal diffusion, in some form or other, shows it to be co-extensive with reason itself. It does not, therefore, depend on the approval of individual reason. Some reasoners, it is true, altogether reject the spontaneous and instinctive exercise of reason referred to, and refuse to receive anything which is not vouched by the intelligent, that is, the individual and voluntary use of reason. This mode of judging is commonly called Rationalism, but its claim to that title may be considered doubtful. The spontaneous exercise of reason may or may not confirm the common or instinctive use of reason, but when it is laid down as a principle that the instinctive use of reason is worthless the question is evidently prejudged, and the sphere of reason arbitrarily restricted. This procedure is quite distinct from, and indeed opposed to, the philosophical method recommended by Descartes. That philosopher determined to subject all his opinions to the determination of his reason, but in doing so he did not lay down any first principles except the necessary one of sufficiency of evidence to convince his reason. The error of Rationalism consists not in making intelligent reason the final judge, but in prejudging instinctive reason, which, although it may be inadvertently exercised, or may even have borrowed its conclusions, evidently rests in ultimate analysis on the same foundation as intelligent reason. The fact of a belief being widely spread without concert among the various races of men cannot be neglected by intelligent reason, and unless it can be clearly accounted for on a more reasonable hypothesis it must be received as a necessary deduction of reason.

Another error of an opposite kind consists in regarding religion as purely a matter of revelation.

According to this theory there is only one true religion, and all others are false. The notions of religion commonly diffused may either be regarded as sprung from an original revelation subsequently corrupted, or as being altogether without authority. In the former case they are held as proof of a primitive revelation, but it seems rather that the unbroken communication of a primitive revelation should be proved in order to account for them in this way. The assumption that there can only be one true religion rests on the belief of the unity of God, but as far as the forms and outward observances of religion are concerned the one principle carries no evidence whatever of the other. If there is only one God, the nature of God must comprehend infinite diversity, and it would seem that the forms of religion are limited rather by what is suitable to man than by what is appropriate to God. The true inference from the unity of God is that whatsoever in religion is founded on a true knowledge of him or just apprehension of his character will be more acceptable than what is founded on ignorant, erroneous, and derogatory notions of him, and especially on notions which have an injurious reflex influence on human character and conduct. Whatever may be the case with other assumed revelations, the Christian revelation, while it asserts the fact of a primitive communication of the will of God to man, does not rest exclusively on this foundation. It everywhere assumes a natural knowledge of God, a knowledge which is subject to error, and which it is the purpose of the revelation to correct, but which is not the less accepted as the natural foundation of religion, and as implicitly containing the obligations to God by which man is in conscience bound. The Christian revelation itself, therefore, appeals to human reason as the ultimate standard of judgment in religion.

In the common and practical use of the term, religion is applied to the outward acts, forms, and ceremonies by which men express their reverence for God, or for those superior beings whom they assume to be possessed of the divine nature. These acts may be either individual or collective. The specific use of the term religion applies to the collective acts and ceremonies which constitute an organized form of devotion. Thus we speak of the Jewish, the Mohammedan, and the Christian religions, and of the various religious sects among Christians. Religions in this sense are divided into two great classes, polytheistic and monotheistic. The natural origin of both is obvious. The powers of nature by which man is surrounded, to which he is subject, and which are unknown to him, are numerous, hence it is natural for him to imagine numerous superior beings which control them. The natural tendency of the human mind to generalize and unite its conceptions, and the analogies which a better observation shows among the powers of nature, on the other hand, point in the direction of unity. Polytheism may thus be regarded as the primitive, and monotheism as the complete form of natural theology. Another distinction might be made, but it would rather be individual than popular. According as the reasoner derived his notion of God from reflection on his own nature or on the diversity of external nature he would be likely to incline in the first instance towards monotheism or polytheism. Thus we may understand how monotheistic reasoners should arise naturally in the midst of societies in which the prevailing opinions were polytheistic. The instinct of human nature when developed by reflection would take its higher form at once, when left uncultivated it would seize upon such objects as presented themselves of wonder, awe, or speculation to attach itself to. The natural course of history is thus from polytheism to monotheism,

and in the changes which have been made from one religious system to another this has been the general tendency.

The most remarkable religious conquests in history are that of Judaism, which effected the establishment of a national religion, growing up originally in a single family, in a hostile territory by force of arms and expulsion or extinction of the previous inhabitants, that of Christianity, which, by the power of persuasion and in the midst of persecution, overthrew the polytheism of the most enlightened nations of antiquity, that of Mohammedanism, which, partly by persuasion, but more by force, established itself on the site of the eastern empire of Christianity, and extended its sway over a population partly idolatrous and partly Christian, that of Buddhism, which, being expelled by persecution from India, where it had widely disseminated itself by conversion, spread itself also by moral suasion over the larger portion of Eastern Asia. All these religions, with the exception of Buddhism, which may perhaps be considered atheistic, are monotheistic systems.

Various estimates have been made of the diffusion of the various religious creeds over the world. These are necessarily very loose and often differ widely from each other. They always, of course, include whole masses of people who are merely nominal adherents of particular creeds. In Mulhall's Dictionary of Statistics (1891) we find the following estimate —

Roman Catholics,	200 450 000
Protestants,	140 000 000
Greek Church,	80 000 000
Jews,	6 770 000
Mahometans,	200 900 000
Various,	440 000 000
Total,	1 080,120 000

In the above estimate the number classed under the head 'Various' is about the total which is usually assigned to the Buddhists alone. The following is another estimate based to some extent on the Statesman's Year Book for 1901 —

Roman Catholics,	250 000 000
Protestants	150,000 000
Eastern Churches,	128,000,000
Mohammedans,	190 000 000
Buddhists,	350 000,000
Brahmanists or Hindus,	210 000 000
Confucians and Taoists,	82 000 000
Sinto Religion,	14,000 000
Jews,	8,500,000

RELIGION, ESTABLISHED, or STATE RELIGION, is the form of religion recognized by the government or constitution of a country as national, and to which accordingly certain privileges and commonly a public maintenance are assigned. In Protestant countries the established form of religion is commonly called the Established Church. The national religion is commonly, and indeed invariably, founded on some thing deeper than the payment of a class of ecclesiastical officers by the state, which is its outward manifestation, and which is often all that is supposed to be understood by the term. The association between church and state for common purposes, and the recognition of some form of religion as a national one, is nearly co extensive with history, and the laws of most countries are imbued with traditional views of religion. The idea of the complete separation of church and state, or of civil and ecclesiastical affairs, seems to be entirely a modern one. A national religion almost inevitably implies some common obligations, and the positive requirements of the Christian religion are of such a nature that when enforced by external authority they are peculiarly liable to become intolerant and persecuting. This is abundantly evi-

dened by history. In Great Britain, long after the Reformation, the conception of a national church was held to imply compulsory adhesion to it. The very nature of Christianity, however, forbids the restraint of conscience, or what is the same thing, the imposition of religious principles or practices by external authority. Hence from the bosom of Christianity has sprung an opposition to its establishment by the state, but this opposition is only valid against a form of establishment which coerces private opinion. In favour of the general principle of a public recognition of religion there remain the natural religious instinct of mankind, the uniform testimony of history as to the tendency of this instinct to develop itself in this direction, and the many questions which are at once public or national and religious, and which neither state nor church can well refrain from dealing with in some way. If, therefore, a sufficient uniformity prevails among a people as to the principles and form of religion by which it desires to be governed a national organization of religion in that form and according to these principles, if it does not assume a coercive character, can hardly be more reasonably objected to in the interest of the minority than any other institution of a public character which is not unanimously approved. It may even be urged in favour of the national recognition of religion, that if the majority of a nation are prevented from making this public recognition of it, from asserting as the fundamental principle of the laws and policy of the state that which they regard as of primary importance to its welfare, it is they who are subjected to coercion by the minority. Religion is of such a nature that it cannot be ignored, and as one or other party must yield, it does not seem provided there is no individual coercion, that the establishment of religion in face of a protesting minority is a greater violation of liberty than its disestablishment under the same circumstances. In recent times it has been proposed by those who, while objecting to the existing forms of religious establishment, are not averse to a close union of the church with the state, either that the national church should be creedless and undogmatic, and so capable of including all Christians or all Theists, or that all the chief religious denominations should be equally established upon a federal basis.

RELIGIOUS LIBERTY, or LIBERTY OF CONSCIENCE, is the recognition and assertion by the state of the right of every man, in the profession of opinion and in the outward forms and requirements of religion, to do or abstain from doing whatever his individual conscience or sense of right suggests. Religious liberty is opposed to the imposition by the state of any arbitrary restrictions upon forms of worship or the propagation of religious opinions, or to the enacting of any binding forms of worship or belief. The limit of religious liberty is necessarily the right of the state to maintain order, prevent excesses, and guard against encroachments upon private right. The principle of religious liberty has come very slowly to be understood. The state of the ancient world in regard to questions of liberty of conscience was somewhat different from that of the modern. Many national religions did not make universal pretensions, and within their limits there was considerable latitude, the worshipper of one god did not necessarily impugn the authority of another. Yet instances of intolerance are to be found, as in the case of Socrates, even in the most liberal states. When Christianity with its monotheistic creed and universal pretensions appeared the case was altered, and it speedily drew on itself a treatment different from that which merely national religions had received from the rulers of the world. Christianity early developed within itself sects which did not manifest towards each other a

very tolerant spirit, but it was only when the civil power had been gained to its side that these differences could assume the form of open repression and persecution. It was then found that the persecuting spirit could distinguish a church not less than a secular government, and, indeed, that from the constant occupation of the former with religious affairs the danger of persecution from it was much greater than from the most intolerant civil government. In the organization of civil and ecclesiastical government which prevailed from Constantine to the Reformation persecution was in general only limited by dissent, and universal submission to the dominant church became the condition of religious peace throughout Christendom, while religious liberty was unknown.

The contest of opinion begun at the Reformation had the effect of establishing religious liberty, as far as it at present exists, but the principle itself was so far from being understood and accepted in its purity by either party that it hardly suggested itself even to the most enlightened reasoners of that age. The contest between the reformers and the church was primarily one of authority, and so great was the regard of the former to the authority of their own confessions, that in Germany itself the common dangers they encountered from the Romanists could hardly keep the Lutherans and Calvinists united during actual hostilities.

In Great Britain even civil liberty, jealously maintained, was not understood, by the dominant party at least, to import religious liberty. Active measures of intolerance were adopted against Dissenters in the reign of Queen Anne. Even in the reign of George III conditions were attached to the toleration of Dissenting preachers. It was not till the fifty third year of this reign that Unitarians were included within the benefits of the toleration acts. Civil enactments against Roman Catholics were repealed within the reign of Victoria. The case of the Catholics is, however, peculiar, and cannot be taken as an absolute criterion of religious liberty. Formidable civil dangers were apprehended from the Catholics when the disabilities upon them, whether civil or religious, were imposed. The latter were never justifiable, but if the former have been slowly repealed, something must be allowed for the natural inertia which makes every political reform a work of time, and something also for the semi political character which Catholicism still maintains.

Religious liberty was introduced in Prussia by Frederick the Great, but contravened by his immediate successor. The state at present in Prussia, without, perhaps, actually dictating to private individuals, maintains a vigilant control over ecclesiastical organization, the education of the clergy, and all public matters connected with religion, which only do not affect religious liberty if they are strictly confined to state protected churches.

Joseph II, the philosophical emperor of Austria, found his Protestant subjects sufficiently advanced to be beyond the need of his control, and reserved such persecution as he was disposed to exercise for the Catholics. By his religious reforms he excited a revolt among his Belgian subjects, which was only terminated under his successor. Religious liberty has only been established in Austria during the present reign. Italy first enjoyed the same advantage under Victor Emanuel II. The government of France, even since the revolution, has always been of so paternal a character that it is still somewhat doubtful on what foundation the liberties of Frenchmen rest, but practically religious liberty exists in France. In the minor states of Europe various customs prevail. Many of them have taken a distinguished part in religious contests, but whether Protestant or Catho-

lic, their views of liberty have not, on the whole, been more advanced than those of their more powerful neighbours. In Spain, in the days of its power the most bigoted state in Europe, restricted liberty of worship was allowed only in 1876. Religious persecution was actively conducted against the Catholics in Russia during the reign of the emperor Nicholas. Since the Crimean war religious liberty has been recognized in Turkey.

From this review it appears that toleration has been slowly advancing in Europe since the Reformation, and that its recent progress has been extensive. Even in the most advanced countries, however, the state of public opinion on this subject is still far from being satisfactory. Those who have observed the progress of religious liberty must have perceived that frequently those who have done most for its promotion have been those who, like Gallo, 'cared for none of these things,' and its most active advocates are often still to be found among this class. Such advocates, however, commonly put it upon grounds which are both inadequate and compromising. Nothing is more common in the press of this country, for example, than to find those who imagine themselves the most immaculate advocates of religious freedom urge it upon such grounds as the doubtful character of religious beliefs, the difficulty or impossibility of arriving at any certainty as to what is right or wrong in religious doctrine or practice, the frivolity which is assumed to characterize all serious discussion of matters so incapable of settlement, and in general the indifference which sensible and impartial men are supposed to feel for the prevalence of one set of doubtful doctrines or practices over another.

To advocate religious toleration on such ground is gratuitously to provoke against it the hostility of all who have settled religious convictions. The difficulty of arriving at right views of religion is undoubtedly a ground of toleration, but it is one which can only be felt by those who perceive the difficulty, and even by them it may be held to be only a temporary one. Thus it has been held, and after due instruction in the truth further toleration has often, by the highest religious authorities, been deemed unreasonable and inadmissible.

Religious liberty rests altogether on different and surer ground. Liberty is correlative with responsibility, and as on philosophical grounds a man cannot be held responsible further than he is free, so in practical affairs no man can competently discharge his responsibilities who is denied freedom of action. Religion primarily concerns the conscience, which is the seat of human liberty, if that liberty exists anywhere. The value of religious observances depends upon their being the expression of religious thoughts and opinions. To compel a man who holds certain opinions to observe certain practices corresponding with them is to deprive him of the opportunity of giving free and natural expression to his opinions. If this is done in religion he is deprived of the natural outlet for his feelings of reverence and devotion. The spontaneity necessary to the discharge of his avowed responsibilities does not exist, and his religious life is thwarted and deadened. Thus compulsion in religion is injurious not only to those who resist, but still more to those who acquiesce, and freedom is indispensable, as much for the protection of those who are in the right as for those who, in the view of authority, are in the wrong. The religion which is imposed by authority is the religion of the rulers and not of the ruled, and despotism in religion is the worst species of despotism.

RELIGIOUS PEACE See **PEACE** (RELIGIOUS).
RELIQUARY, a box or casket in which relics are kept. See **RELIC**.

REMAINDER, in law, is a limited estate or tenure in lands, tenements, or rents, to be enjoyed after the expiration of another particular estate.

REMBANG, a town of Java, in the province of same name, on a deep bay on the north coast, west of the river Rembang, and 60 miles W N W of Samarang. It is a lively, thriving town, with a roomy barrack, a good hospital, a mosque, a school, and some other respectable buildings. Its harbour, one of the best in the island, is protected by a point named Oudjong Boender, which stretches far into the sea, and by some islands, among which are the Two Brothers. It has a good trade in ship timber and in ship building, and near it are valuable salt pans. Pop. 11,000.

REMBRANDT (**REMBRANDT HERMANSZON VAN RYN**), one of the most celebrated painters and engravers of the Dutch school, was born on July 15, 1606, in a mill near Leyden, which belonged to his father, Herman Gerritszoon van Ryn. His passionate love for art disappointed his father's desire of educating him as a scholar. He received instructions from Van Swaenburgh of Leyden, a painter of little note, and afterwards studied in Amsterdam under Lastman, called by Vondel the Apelles of his age, and Kins, a painter of Haarlem. But he soon returned home, and pursued his labours there, taking nature as his sole guide. The type of nature which he consulted was, however, a low one, his situation was by no means adapted to lead him to a conception of the truly beautiful, sublime, and ideal, and as he made no effort to correct the defects of his early education, it was natural that he should confine himself to delineations of common life, and find pleasure in them alone. Throughout his whole life he retained both this view of art and the same mode of living, associating only with common people, and never acquiring a taste for better society. About 1630 Rembrandt removed to Amsterdam, and in 1634 married a handsome girl, whom we find often copied by him, the daughter of Rombertus Ulenburgh, burgomaster of Leeuwarden. His paintings were soon in extraordinary demand, he also took a great number of pupils, of whom he received a high price for his instructions, selling their works, retouched by himself, for his own. He never left Amsterdam again. As early as 1628 he had applied himself zealously to etching, and soon acquired great perfection in the art, his etchings were esteemed as highly as his paintings. He sold impressions from unfinished plates, then finished them, and after having used them made some slight changes, and thus sold the same works three or four times, while such was the demand for his productions in this class that collectors made a point of securing his etchings in all their stages. Many stories are told of the acquisitiveness of Rembrandt, and of his parsimony, but they do not appear to be all well founded, and he would seem to have been chargeable only with the former of these qualities. He acquired considerable wealth by his work, but his expenditure, together with claims on him which he resisted, seems to have been greater. He was declared insolvent in 1656, and his estate remained in the hands of trustees till his death in 1669. Among the celebrated works of Rembrandt are the Presentation in the Temple (1630), Descent from the Cross (1640), Night Watch (1642), Five Syndics (1661), Adoration of the Shepherds (1646), Woman taken in Adultery (1644), Christ Blessing Little Children (about 1650), Nativity (1646), the last four are in the National Gallery, the Hundred Guilder Print (1648). Rembrandt's great excellence was as a portrait-painter. He wanted some of the qualities necessary to give perfection to his historical paintings, or rather it might be more correct to say

he did not take the trouble to acquire them. His drawing was often inaccurate, and generally deficient in delicacy. His colouring was brilliant, though somewhat monotonous, in command of *chiaroscuro* he was unrivalled, and his power of composition was of the highest class. His draperies were selected without regard to historical accuracy, and his designs sometimes displayed a want of taste. His etchings are still very highly prized. His most distinguished pupils, who are easily recognized by their manner of colouring, were Ferdinand Bol, Gerard Douw, Gerbrand van Eeckhout, Michael Poorter, Philip Koninck, Govaert Flinck. The best biographies are those in French by Vosmaer (Eng. trans., 1879) and Michel (1893, Eng. trans., 1893), especially the latter. See also P. G. Hamerton's *Rembrandt's Etchings* (1894).

REMIGIUS, St., Archbishop of Rheims, born in 437 of noble parents, obtained his see in 471, in the reign of Clovis, king of the Franks, in the Christian religion, and baptized him in 496. He died in 533. — Another **REMIGIUS**, Archbishop of Lyons in 852, took part with the monk Gottschalk in the controversy raised by him against Hincmar of Rheims. He died after 875.

REMIREMONT, a town of France, in the department of the Vosges, picturesquely situated at the foot of the Vosges, on the left bank of the Moselle, 16 miles south-east of Epinal. The houses, though for the most part rather low, are neat and regular, and usually adorned with arcades. The streets are well laid out and spacious. There are interesting remains of an ancient abbey. The chief manufactures are cotton, muslin, stained paper, leather, &c. There are also iron and steel works. Pop. (1896), 8369.

REMITTENT FEVER, or **JUNGLE FEVER**, a fever which is due to very much the same cause as ague, and on this account might be described as a *miasmatic fever*. Remittent fever is severe or otherwise according to the nature of the climate in which the poison is generated. The autumnal remittents of temperate climates are comparatively mild, while the same fever in the tropics is often of a very severe type, and not unfrequently proves fatal. Remittent fever, like ague, has its cold, hot, and sweating stages, but the cold stage is very short and hardly recognizable. The fever of the hot stage is very high, and this period usually lasts from six to twelve hours. The vomiting which occurs is violent and distressing, the ejected material being at first colourless, but afterwards bilious or even bloody. The sweating stage is less marked than in ague. With it the fever diminishes and the other symptoms improve, and the *remission* occurs, which differs from the interval of ague in the important fact that the disease does not disappear for a time, but simply abates, to renew its violence in ten or twelve hours. The remission usually occurs in the morning, and the fever is at its height by midnight. Day after day the attacks recur, usually at first with increasing severity. The illness lasts from five to fourteen days, and a favourable termination may be expected when the remissions are distinct and last for several hours. The treatment is similar to that for ague. It is said to be well to begin with a purgative as soon as the disease shows itself, and to an ordinary strong adult 3 to 5 grains of calomel, the same of compound extract of colocynth and of powder of scammony, with 5 grains of quinine are advised. In the absence of these separate ingredients one blue and one compound colocynth pill with 5 grains of quinine form about the same dose. No more medicine is to be given till the first remission, when 10 grain doses of quinine must be administered in

a solution containing a little tincture of steel. If the quinine cannot be retained on the stomach it should be carefully injected into the bowel. To relieve the sickness small pieces of ice should be given to suck, and warm cloths are applied over the stomach. When the fever ceases, nourishing food is necessary. Easton's syrup (quinine, iron, and strychnine) aids in restoring the patient's strength.

REMO, SAN, a seaport and health resort of Italy, in the province of Porto Maurizio, 30 miles N.N.E. Nice, on the Mediterranean, in the coast district known as the Riviera. It is completely shut in on the north by a semicircular hill rising to the height of about 4000 feet, and itself rises from the sea somewhat in the figure of a triangle, the base of which is formed by the shore and the apex by the church of the Madonna Della Costa. It consists of an upper and a lower town. The former is very ancient, and consists of lofty houses placed in narrow and almost inaccessible lanes and streets, the latter is much better built, and now has many fine villas and modern hotels, but the streets are generally steep. San Remo has numerous churches, among them being two English churches and a Scotch and American Presbyterian. It is frequented in winter by persons suffering from chest affections, as well as by other invalids. The climate is so warm as to permit of palms and other tropical and sub-tropical plants growing freely. Pop. (1896), 18,500.

REMONSTRANTS. See **ARMINIANS**.

REMORA, a genus of Teleostean fishes usually included in the family Scombridae (mackerels), and of which the Common Remora (*Ichthyura Remora*) is the typical example. The top of the head is provided with a peculiar sucking disc composed of a series of cartilaginous plates arranged transversely, and by means of this apparatus these fishes attach themselves to fixed objects. The Common Remora attains an average length of 1 foot, and possesses a general resemblance in form to the herring. This fish is common in the Mediterranean and in the Atlantic, and also occurs around the British coasts. Other species are of larger size, and on the coast of Zanzibar and elsewhere these fishes are used in catching other fishes and turtles, the Remora being secured by a line fixed to the tail, and being sent in pursuit of the turtles, &c., to which it attaches itself by means of its sucker. The ancients believed in the Remora's power of arresting and detaining ships in full sail through their suction powers, and Antony's galleys at the battle of Actium was said to have been fixed by a Remora, which defied the efforts of several hundreds of men to free the vessel. Caligula was said to have been detained in a similar manner, until a scam in detached the Remora and set free the ship. See illustration at **ICHTHYOLOGY**.

REMOVAL OF THE POOR. By the English poor law a pauper is only entitled to temporary relief in a parish where he has not acquired a settlement by birth or residence, and arrangements are made as soon as possible to remove the pauper from the parish or union on which he has become temporarily chargeable to that on which he has a permanent claim. This power of removing paupers has existed from the time of Charles II., at first in a form almost unlimited, the parish in which a man was born being held the only one on which he could acquire a claim for permanent relief. The regulation was, of course, intended to prevent the different parishes from attempting to free their rates at the expense of each other, by removing, or inducing their poor to remove, beyond their bounds. Among other grave objections to the mode of accomplishing this necessary object it, with its attendant regulations, has acted as a powerful obstacle to the changes of residence among labourers

indispensable to a free circulation of labour, and to the healthy action of the supply on the demand. The period of residence necessary to acquire a settlement has been repeatedly modified. By 28 and 29 Vict cap lxxix. (1865) it has been reduced to one year, by which the evils of the regulation have been greatly modified.

REMSCHIED, a town of Prussia, in the government and 18 miles S.E. Düsseldorf, on a rugged height. It has extensive manufactures of various articles of ironmongery (known as 'Reimscheid wares') which have a great reputation and form the object of a large trade. Other articles of manufacture are machinery, tools, silk ribbons, &c. Pop in 1885, 33,986, in 1895, 47,283, in 1900, 58,108.

REMUS See **ROMULUS**

RÉMUSAT, **JEAN PIERRE ABEL**, one of the most distinguished linguists of Europe, member of the Academy, and professor of the Chinese and Tartar languages at the Collège de France, was born at Paris, Sept 5, 1788. Having studied medicine he received the degree of doctor in 1814, but at the same time followed his inclinations, which led him to the study of the oriental languages, particularly the Tartar, Chinese, Tibetan, &c. In 1811 appeared his *Essai sur la Langue et la Littérature Chinoises*, which attracted the attention of the learned, and opened to him the doors of the Academies at Grenoble and Besançon. Some other writings on the Chinese soon followed. In 1814 Louis XVIII appointed him professor, and in 1816 he was admitted into the Academy of Inscriptions. After Visconti's death in 1818 he was appointed editor of the *Journal des Savans*. Many excellent treatises by him appeared in the *Moniteur*, in the *Journal des Savans*, in the *Fundgruben des Orients*, &c., some of which have also been published separately. His principal works, besides the *Essai*, were his *Plan d'un Dictionnaire Chinois* (1814), *Le Livre des Récompenses et des Peines* (translated from the Chinese, 1817). He also assisted in the *Mémoires concernant les Chinois* (1814, in sixteen vols.), and in 1820 made known to us a second Plato in the Chinese philosopher *Laotse* His *Mélanges Asiatiques* (Paris, 1825, two vols.) contain treatises upon the religion, morals, language, history, and geography of the nations of the East. In 1827 he made the Parisians acquainted with the manners of the Chinese through his *Contes Chinois* (three vols.). He died in 1832.

REMY, **ST.**, a town in France, in the department of Bouches du Rhône, 6 miles N.E. of Arles, and 42 miles N.W. of Marseilles, on a slope above the Canal des Alpines and overlooked by the hills of this name. It represents the ancient *Glanum* *Livii*, destroyed by the Visigoths in 480, and among the remains of this place are a fine triumphal arch in the Corinthian style, adorned with bas-reliefs and other sculptures, and a well preserved mausoleum belonging to the end of the third century. There are quarries of excellent building stone, worked from early times. Pop 3500.

RENAISSANCE, a term applied, in its more specific sense, to a particular movement in architecture and its kindred arts, and to the architectural styles of which the origin is ascribed to this movement. In a wider sense the word renaissance is more frequently used in France than in this country, but it has the convenience of expressing better than any English term a movement which constitutes one of the great epochs of history, the movement which is frequently referred to by the much more restricted term the revival of letters.

The historical renaissance was a revival in a great and general sense. It has been well described as the spring time of the human mind. No definition of the renaissance which does not refer it to mind can be

an accurate one, but it was a movement of mind in the widest sense it was not exclusively literary or artistic, it was pre-eminently scientific, it was also social, political, and commercial, and it was crowned by a religious movement, the greatest since the promulgation of Christianity. The renaissance was the introduction of modern history. Its force is yet unspent, and we may with the strictest propriety be said to live in the epoch of the renaissance. Whether we have advanced to the summer or autumn of the period is a question which the future alone can determine.

This great historical movement is usually ascribed mainly to the sixteenth century, but like all complex movements its preparations had begun far in advance, and its roots were struck deep in past history. The beginning of the renaissance may be formally dated from the taking of Constantinople by Mohammed II (29th May, 1453), which finally overthrew the Greek Empire. This event supplies both a close to the old epoch and a beginning to the new, but in regard to the latter it must be understood as only a formal commencement. It gave indirectly a stimulus to one of its leading manifestations by driving Greek scholars to Europe, and exciting, especially in Italy, an enthusiasm for classical learning, in doing this it rendered a great service to the new movement, but it was not an efficient cause of it. See **HUMANISM** in **SUIP**.

The political movement of the renaissance had been anticipated for centuries by the struggles of cities and industrial populations to shake off the shackles of feudalism. These isolated efforts were now merged in great political combinations, in which the various powerful states formed amid the struggles and rivalries of the national hierarchies of mediæval growth met face to face, and freed from domestic insubordination, strove to extend their influence at the expense of each other. The direct effects of the rivalry of the greater states was and has continued to be evil, but the evils produced by it were much more than compensated for by the extinction of minor rivalries, which, by a continuous internecine strife, prevented national organization, and rendered all progress impossible. Great nations, even when subject to great wars, have intervals of repose, and even in periods of the most active hostility the national life and progress is never wholly interrupted. But the states of Europe being too equally matched to admit of permanent conquest, the inconveniences of perpetual strife could not fail to make themselves felt, and by and by a steady gravitation began to appear towards the adoption of general principles of international law and policy. The growth of international law tended to create wider views of jurisprudence, and the aim at least of international policy was to set bounds to ambition and lessen the frequency of war. Little as the success has yet been, this object has been constantly pursued up to the present day. The first theory which developed itself out of the successive efforts made with this end was that of the 'balance of power'. It may be doubted, and it would be impossible to determine, whether the balance of power has caused most wars or has prevented most. Nearly all the wars which have been made since this idea was entertained have been made on the basis of it, but we do not know what wars would have been made without it. Many statesmen have, however, come to regard the balance of power as an impracticable speculation, and it has begun to be superseded in modern times by the doctrine of non-intervention. The doctrine of non-intervention has not proved effective in preventing quarrels, but it lays down the principle, not always observed, and which can hardly be consistently followed without some lack of magnanimity, that when quarrels arise those who are not

interested in them need not interfere. Neither of these schemes, it is to be observed, is founded on the principles of abstract justice. Statesmen have generally held the principle that the application to particular cases of the principles of abstract justice would be impracticable in international affairs, and that these must be guided by great leading maxims of practical policy. The failure of the application of mechanical rules, which really means the application of injustice, to international affairs may possibly lead at last to an attempt to inculcate and enforce some elementary principles of justice in the dealing of states with each other, but this development can hardly yet be said to have been reached.

The formation of large states has been attended with more profitable results in social organization. A central power, even when despotic, is never so oppressive as local despotisms. The monarchical power in Europe, having grown up in opposition to the local feudal powers, was not in a position to establish subordinate local despotisms, but was compelled to ally itself with the people against those which already existed. Thus the growth of monarchy was attended with the growth of popular privileges, the establishment of general laws, increase of security, and extension of social intercourse between the various parts of a kingdom. The fruits of this revolution began to appear at the renaissance. Roman law had begun to prevail over the customs of feudalism, and the general security gave everywhere a stimulus to the growth of industry and the improvement of the peaceful arts of life.

The literary awakening of the renaissance was a natural result of the enhanced activity of social and national life. It has been observed that this awakening produced at first a movement which in its general direction was wholly retrospective. This is in fact at once its most distinctive and its most valuable characteristic. The civilizations of the past had attained a higher elevation than that of the middle ages, but their treasures had been buried by the general ignorance, and many of them had even been ruthlessly destroyed. It was therefore by no means a proof of servility, but a sign of the healthy and progressive character of the newly awakened intellectual life, that its first energies should have been devoted to the recovery of those neglected stores of wisdom which had already been laid up for it by the industry of the past. Thus a broad foundation was laid for its future developments. It was to this necessary work of preparation that the fall of Constantinople contributed a powerful stimulus. Of the direct results of this revival of ancient learning, which has given its distinctive name to the epoch among us, none was of more consequence than the restoration of Plato to honour and authority in philosophy. This was important not only on account of the intrinsic value of Plato's philosophical speculations, but as a reaction from the dogmatic sway of the logical system of Aristotle as ultraneously developed by the schoolmen. It is true that this movement was at first exaggerated, and that Platonism became among the scholars of Italy a sentimental dogmatism in its turn, but the restoration of Plato meant the downfall of scholastic philosophy: it meant the re-establishment of psychology in place of the subtleties of misapplied logic in the study of the human mind, and it harmonized with, if it did not prepare the way for, the substitution of induction for the combination of empiricism and mysticism which had taken the place of natural science. In natural science, however, as in other departments of thought, the renaissance had been anticipated by the great minds of the preceding ages. It is sufficient to name Roger Bacon, and as the pioneer of science

in the age of the renaissance itself we may name along with him Bernard Palissy.

This was, however, most clearly demonstrated by results in that great department of applied science, navigation and geography, which opened up to the revived industry of Europe so vast a field of new enterprise. The discoveries of Bartolomeo Dias, Vasco de Gama, and Columbus were prepared by a succession of scholars and scientific theorists, who kept alive the light of ancient knowledge on the problems of geography, and framed the speculations which guided to new discoveries. The work of discovery itself was begun by the Portuguese half a century before the epoch of the renaissance, but the brilliant results which created modern commerce, and by the wealth and power they conferred on the industrial classes did so much for the establishment of political freedom, belong to that epoch.

To the religious movement which crowned the renaissance the same remark applies. Luther was preceded by Wicliffe and Hus, but upon this movement we need not enter. It has been fully treated in a separate article. See REFORMATION.

A general revival of activity in the fine arts was part of the great movement described, but the term renaissance has been specifically appropriated to architecture, from the peculiarity of the movement which took place in that department. This movement was not an unmixed good. To some extent it was rather a retrograde than a progressive one. The middle ages had a great and original style of architecture. For imposing grandeur nothing can equal a well designed Gothic building. Gothic architecture was due to the invention of the Teutonic and Celtic nations, by whom the Roman Empire was overthrown. It was introduced into Italy, but, though modified according to the genius of the people, never became thoroughly naturalized or truly appreciated among the Italians. In Italy a reaction to classical forms of art was natural, but when this was imitated in other countries, hybrid and ill arranged classical forms often came to supersede art of a higher class which had ceased to be understood and appreciated.

The Gothic style in Italy, according to Fergusson, though aided by the best possible construction, with the most beautiful material, only gave rise to 'cold, unmeaning, martistic productions, with all the defects and hardly one of the beauties of the true pointed Gothic edifices'. The Italians, who according to this writer have never been good architects, reverted at the time of the renaissance to the Roman style, a style borrowed from the ancient Greeks, and which the Romans had never understood, had misused, misapplied and spoiled. It was the style employed by the Romans in such public buildings as the Colosseum, not the temple style, which was restored at this time. 'Unfortunately for Europe,' says Fergusson, 'the revival of classical literature at the same time led the northern nations to follow in the same vicious path, and to cover the land with all the absurdities of the revived classical school'. The various developments of this general movement have received names from the respective countries where they took their rise: thus we have the French renaissance, the German, the English, and the Spanish renaissance. We shall not go into the separate criticism of these styles. The renaissance style in Italy can be traced as far back as the middle of the fourteenth century. It formally began with Brunelleschi about the beginning of the fifteenth, and was fully developed in the following century. The renaissance in France was especially associated with the name of Philibert Delorme. In England it was introduced at a later period, and is represented by the works of Inigo Jones and his contemporaries. To give a critical

estimate of renaissance art in its various national adaptations would be to enter on a history of modern architecture. The subject is one which cannot be profitably summarized, because authorities differ widely not only in their appreciation of results, but in the principles on which they judge of them, and without a technical study of details it is scarcely possible even to comprehend the grounds of their differences. According to Mr Ferguson a first period of renaissance art, a very brief one, seemingly confined to Italy, was a genuine revival of true artistic principles, all beyond this period was degeneracy and corruption.

The renaissance styles seem to be distinguished by one common characteristic, an eclectic or imitative spirit. The adoption of classical models might have been followed by a profound study of the principles of art involved in these forms, and an independent application of these principles, but this does not appear to be what has happened. Working from models both in plan and in details seems to have been adopted as itself the principle of the new art, and this principle seems to have been extended to the Gothic as well as the classic forms, so that architecture has become a reproductive rather than a creative art.

In the design of a building from classic models various styles were at one period of the renaissance purposely imitated in the various stages of the building. Composite orders were thus introduced, in which the principles of combination depended solely on the taste and judgment of the individual architect, and were governed by no inherent law of propriety or principle of art. Again, the forms of buildings were determined by circumstances which did not enter into or control the details of their construction, thus the form of a building might be Gothic or Byzantine, and the plan of its construction classical. Another feature is especially characteristic of the eclectic spirit of the renaissance art. In strictly original or primitive forms of art all the features introduced are purely constructive, that is to say utilitarian. Whatever laws of symmetry may be observed their form is dictated by the purpose they are intended to serve. In the renaissance period the imitation of architectural forms for purposes of ornamentation, and as mere features of beauty, without regard to utilitarian purpose, was freely adopted. Thus, semi detached columns were used as ornamental features in walls, then rows of pilasters, and similarly with other architectural features. According to Mr Ferguson all architectural styles up to the first period of the renaissance were true, all subsequent styles have been false. Since the sixteenth century, it would appear, not a single original building has been erected in Europe, so that Mr Ferguson considers himself justified in holding 'that there are in reality two styles of architectural art, one practised universally before the sixteenth century, and the other since then.' Mr Ferguson's view appears, however, to be extreme, and his principle of criticism impracticable. It will scarcely be credited that imitative art began with the sixteenth century. Roman art, according to Mr Ferguson himself, presents a marked exception. Mr Ferguson holds broadly the principle that ornamentation in architecture should be subordinate to constructive purpose, but it is not easy to see how far this principle would carry us, for without some latitude of interpretation it does not seem to rest on very satisfactory ground. The symbolic use of architectural features, as of pillars to indicate strength, is unquestionably an element of beauty, and in minor details of ornament the mere play of fancy has a scope which it would be difficult to set bounds to. Extra-

vagance in ornament is no doubt a sign of degeneracy, but this can hardly be eliminated by a single canon of art. It may be that the eclectic character of modern or renaissance art is a disadvantage, but it is one of the drawbacks inherent in knowledge, and which cannot be got rid of. In architecture, as in poetry, the necessity of invention may give a superiority to the earlier forms of art which the later strive in vain to acquire by imitation, but when a variety of primitive forms is known, imitation becomes a necessity. The remedy appears to lie in a different direction, a profound study of models, resulting in a more free and unconventional use of them. See Symonds's Renaissance in Italy (seven vols. 1875-86), Burckhardt's Renaissance in Italy (Eng. trans. 1890), and Voigt's Die Wiederbelebung des klassischen Altertums oder das erste Jahrhundert des Humanismus (3rd ed. 1893).

RENAIX (Flemish, *Rouve*), a town in Belgium, in the province of East Flanders, 24 miles south of Ghent. It is picturesquely situated on three public squares, each adorned with a fountain, three churches and two chapels, a town house, hospital, and several public and private schools. The manufactures consist of cotton stuffs, linen and woollen cloth, tobacco, &c. There are also breweries, distilleries, tanneries, dye works, bleachfields, &c. Renaix dates from the eighth century. Pop. (1894), 17,984.

RENARD THE FOX, the name of an epic fable in which the characters are animals, the fox being the hero, and which in various forms was extremely popular during the middle ages, and for many years afterwards. The latest version of the story, and that which indeed supplanted all the rest, is in the Low German dialect, and was printed at Lübeck in 1498 under the title of *Reynke de Vos*. The author calls himself *Hunrik van Alkmer*, schoolmaster and tutor to the Duke of Lorraine, but it is believed that this is merely a pseudonym, and that the real author was Hermann Barkhusen, town clerk of Rostock, and printer there. The *Reynke de Vos* is in verse, and is founded on the oldest Flemish or Dutch redaction of the story in prose. It relates the adventures of the fox (*Reynke*) at the court of the king of beasts, the lion, and details with great spirit and humour the cunning modes in which the hero contrives to outwit his enemies, and to gain the favour of his credulous sovereign. The poem may be regarded, with Mr Carlyle, as 'a parody of human life.' There is no personal satire in it, but the allusions to the weak points in the social, religious, and political life of the time are numerous and unmistakable.

It was not till the learned labours of Jakob Grimm were given to the world that the historical development of the fable of Renard the Fox was properly understood. He has pointed out that the beast fable is common to all the Aryan races, and not unknown among others. The fables of *Æsop* are one of the best known examples of the tendency to represent animals as talking and acting like human beings, but it appears that the beast fable first took on an epic form among the German races, especially the Franks, by whom it was carried to the Low Countries and the adjacent parts of France, where it took firm root. The chief actor in the story was originally the wolf—*Isengrim* (that is, iron helmet), but afterwards the fox—*Raynhoart* ('strong in counsel,' shortened to *Reinhart*, Low German, *Reineke*, Flemish, *Reynaert*, French, *Renard*)—took the foremost place. The lion also (*Prevel* in German, *Nobel* in French), as king of beasts, held an important place. In the tenth and eleventh centuries the monks in France gave a satirical and didactic turn to the fable, and some Latin poems in which it is so treated are still extant. In these much of the satire is aimed

at the pope, the hierarchy, and the powerful Cistercian order. In the mouth of the Franco-Flemish people, however, the fable kept itself clear of such allusions, and soon took on a more purely epic form, aiming its satire at human failings in general. In 1170 the story in this more purely epic form appeared in Germany under the title of *Isengrines Nôt*, and somewhat later again in Flemish. The latter version, called *Reinaert*, was completely epic in character, and in plan and execution much superior to any other then existing. Both these works afterwards appeared in a considerably modified form—the former under the title of *Reinhart* about the beginning of the thirteenth century, the latter about the close of the same century. In the meantime a vast number of poems of the beast fable or animal romance class had appeared in France, but only the oldest of those that are extant, which scarcely go beyond the beginning of the thirteenth century, possess the purer epic character. In Germany the beast fable could not maintain its ground side by side with the Sualian court poetry, and was soon given up again, while the rhymed *Reinaert* of the Low Countries, in accordance with an altered taste, was turned into a prose narrative, *De Hystorie van Reinaert de Vos* (Gouda, 1479). This was soon after translated into English by Caxton, and printed by him at Westminster in 1481. The fable now returned once more to Germany, where the Low German version of *Barkhusen* took the place of all others. It was translated into German hexameters by Goethe, whose translation has been turned into English heroic metre by T. J. Arnold. There have been many English versions of the fable, as well as Danish, Swedish, &c. See *NEGRER ANDS*—Literature.

RENDEZVOUS, the port or place of destination where the several ships of a fleet or squadron are appointed to join company, or to rejoin, in case of separation.

RENDSBURG, a town of Prussia, in the province of Schleswig-Holstein, on the Eider, 54 miles N.N.W. of Hamburg. Its principal buildings are two Protestant churches, one of them large and richly ornamented, a R. Catholic church, an old town house, a gymnasium, &c. The chief industries are cotton weaving, wool spinning, brewing, tanning, iron founding, and the manufacture of pianofortes, machinery, artificial manures, artificial sandstone and granite. The town is situated quite close to the line of the North Sea and Baltic Canal, in connection with which great harbour works have been constructed. It has stood repeated sieges and bombardments. Pop. (1895), 11,723.

RENÉ, or **RENATUS I** of Anjou (called also the Good), titular king of Naples, was the second son of Louis II, duke of Anjou, and Yolande, daughter of John, king of Arragon, and was born at Angers in 1409. On the early death of his father his education was undertaken by his grand maternal uncle, the Cardinal of Bar, whom he afterwards succeeded as Duke of Bar. René's grandfather, Louis I of Anjou, was in 1380 appointed by Joanna I, queen of Naples and Sicily, her heir, and after his death his father was indeed crowned, but did not obtain actual possession of the throne. On the father's death Louis III of Anjou, René's elder brother, was adopted by Queen Joanna II, and obtained the government in 1423. He died in 1434, and left, besides Anjou and Provence, the claim to Naples and Sicily to his brother René, who in 1435 was declared heir by Joanna II shortly before her death. René had in 1420 married the daughter of Charles II, duke of Lorraine, and by this marriage, after the death of his father-in-law, had in 1431 become possessed of that dukedom. But in the same year Count

Antony of Vaudemont, son of the brother of Charles II, contested his right, drove him out of Lorraine, and took him prisoner, whereupon the Lorraine states appealed to the Emperor Sigismund to decide the quarrel. After René had in 1432 been released from his prison for a year by giving his sons as hostages, both parties chose Philip, duke of Burgundy, for umpire, but all that he could effect was a marriage between René's daughter Yolande and Antony's son Frederick. Thereupon René and Antony ruled for a long time in common. At last, in 1434, Sigismund gave a decision in René's favour. The dethroned Antony proceeded to the Duke of Burgundy, who required René again to place himself in custody. Scarcely had this been done when an embassy arrived to tender him possession of Naples and Sicily. Philip refused to set René at liberty, and the ambassadors therefore conferred the crown on his wife Isabella, whom her husband named regent of Anjou, Provence, Naples, and Sicily. Isabella set sail for Naples, but there found a competitor in Alfonso, king of Arragon, who maintained his position not only against her, but also against René himself, after he had obtained his liberty in 1437. René, obliged to abdicate, returned to Provence. The government of Lorraine he gave up to his son John, who, after his mother Isabella's death, entered into full possession under the title of John II. On this René retired into Provence to give himself to poetry and the arts. His poetry was confined chiefly to eclogues. He also employed himself with painting, of which he was so passionately fond that he is said to have continued quietly to complete the figure of a partridge on which he was engaged when the news arrived telling him that he had lost his kingdom. After making over Provence to Louis XI he died at Aix in 1480.—2 **RENÉ II**, grandson of the former, and son of Frederick II of Vaudemont and Yolande, inherited from his father in 1470 Vaudemont, Joinville, Aumale, Mayenne, and Elbeuf, and, through cession of his mother in 1473, Lorraine. He acquired the Dukedom of Bar in 1480. Having been involved in disputes with Charles the Bold of Burgundy he was present as an ally of the Swiss at the battles of Murten and Nancy, in the latter of which Charles in 1477 met his death. After this he reigned in peace, but engaged again in war, when, in consequence of his grandfather having made over Provence to Louis XI, the latter endeavoured to establish his right to it by force of arms. He died in 1508.

RENFREW, or **RENFREWSHIRE**, a county of Scotland, bounded on the south and south west by Ayrshire, east by Lanarkshire, north by the Clyde, except a small portion of about 1200 acres, which lies on the north side of the river, and west by the Firth of Clyde, length, 81½ miles, breadth, 13½ miles, area, 244 square miles, or 155,965 acres, of which about 95,000 acres are cultivated. The most elevated ground occurs in the south west and south east, but the hills attain no great height, the loftiest summit being the Hill of Stake on the Ayrshire border, 1711 feet. There are, however, numerous beautiful and extensive valleys watered by the White and the Black Cart, the Gryffe, &c. Towards the centre of the county the general features are striking and picturesque, the surface being in many places well wooded, and varied by fine undulations, knolls, and rising grounds. Along the Clyde the country is comparatively flat, and the soil various, but a great part of it is deep loamy clay, extremely fertile. The south-east part of the county is included in the great coal district of the west of Scotland. Limestone, sandstone, ironstone, granite, and secondary trap rocks are found in considerable abundance. Good freestone for build

ing is quarried, limestone is also wrought for burning, and the mines of coal and ironstone give employment to a great number of persons. Grazing and dairying are extensively practised in this county, particularly in the high districts, where the pasture is excellent. In the middle district, where the latter is not so good, all sorts of crops are raised with the best advantage. Oats and wheat are the chief corn crops, and the most important green crops are potatoes and turnips. Over 45,000 acres are in permanent pasture, about 35,000 are mountain and heath, used as pasture, and some 7000 acres are under wood. The area under orchards is very small. But Renfrewshire derives principal importance from its manufactures and shipping, including as it does Paisley, Greenock, Port Glasgow, Johnstone, Barrhead, &c., as well as the county town, Renfrew. It returns two members to Parliament by the act of 1885, the divisions being East and West Renfrewshire. Pop (1891), 230,812, (1901), 265,934.

Renfrewshire appears to have formed a portion of Lanarkshire, at least to have belonged to the same sheriffdom, up to the fifteenth century. In 1401 Robert III., in order to make a provision for his son James, erected a principality consisting of the barony of Renfrew and the whole estates of the Stewarts, with the earldom of Carrick and the barony of King's Kyle, all of which he granted in a free regality to the prince, and which continued in after times to belong to the eldest sons of the Scottish monarchs. By these arrangements the Barony of Renfrew was separated from the shire of Lanark, and put under the jurisdiction of a separate sheriff. The sheriffdom of Renfrew formerly comprehended the barony and parish of Buthgait, but this detached portion was erected into a separate sheriffdom in 1531 and continued such till 1748 when it was united to Lanarkshire. In 1815 Renfrew was divided into the upper and lower wards, with a sheriff substitute for each. The eldest son of the sovereign still continues to bear the title of Baron of Renfrew.

RENFREW, an ancient royal and parliamentary burgh of Scotland, capital of the above county 6 miles N.W. of Glasgow, close to the Clyde. It consists of a main and several lesser streets, and has a few buildings of note, the most prominent being a handsome town hall. The principal industries are iron ship building, especially the building of steam dredgers, engineering, boiler making, and iron founding, and there are also various other works. The Clyde is here crossed by a steam ferry, and furnished with a commodious quay or wharf, at which the river steamers touch in their passage to and from Glasgow. A large dock is in course of construction, with suitable accommodation for carrying on the traffic expected to be attracted here. Renfrew unites with Kilmarnock, Rutherglen, Port Glasgow, and Dumbarton (the Kilmarnock burghs) in sending a member to Parliament. The town received a charter from Robert III. in 1396. Pop in 1881, 5502, in 1891, 6756, in 1901, 9297.

RENNELL, JAMES, a distinguished geographer, was born at Chudleigh in Devonshire in 1742, and at thirteen was sent on board a ship of war as a midshipman, and served on the Indian station, where he distinguished himself on various occasions, but particularly at the siege of Pondicherry. In 1764 he entered into the East India Company's military service, in which he rose to the rank of major. Previous to this he produced his first work, *A Chart of the Banks and Currents of Cape Agulhas*, the most southern point of Africa. He also surveyed Adam's Bridge and the Pamban Channel between Ceylon and the continent, and suggested a plan by which the passage might be widened for ships. It

was not, however, till upwards of sixty years afterwards that his plan was carried into effect. Having been appointed surveyor general of Bengal, he carried out a survey of the country, and gave to the world his *Bengal Atlas* (1779) and an *Account of the Ganges and Brahmaputra*. He retired from active service in 1777 and soon after returned to England, and published a *Map of Hindustan*, accompanied by a *Memoir*. Besides the works already mentioned he was the author of *Memoir on the Geography of Africa*, with a *Map* (1790), the *Mutchie of the British Army in the Peninsula of India* (1792), *Elucidations of African Geography* (1793), a second and third *Memoir of the Geography of Africa* (1799), the *Geographical System of Herodotus Explained* (4to, 1800), *Observations on the Topography of the Plain of Troy* (1814). He also wrote, among other works, *A Treatise on the Comparative Geography of Western Asia*. Illustrations of the Expedition of the Younger Cyrus, and *An Investigation of the Currents of the Atlantic Ocean and those between the Indian Ocean and the Atlantic*. He died March 29 1830 and was buried in Westminster Abbey.

RENNES, a city of France, formerly capital of Brittany, at present capital of the department of Ille et Vilaine, situated at the confluence of the rivers Ille and Vilaine. It is traversed from east to west by the Vilaine, which divides it into the High and the Low Town, and is crossed by three bridges. The Low Town is smaller, older, and in every way inferior to the other, and from the lowness of its situation frequently suffers from inundation. The High Town lies between the right bank of the Vilaine and the left bank of the Ille and strikingly contrasts with the Low Town by the elegance of its buildings and its spacious regular streets. It owes its present improved condition to a dreadful conflagration which took place in 1720, by which the greater part of the High Town was reduced to ashes, though by the same means it was deprived of much of its historical interest through the destruction of almost all its ancient edifices. The most remarkable of its buildings are the cathedral, the Palais de Justice, the Hotel de Ville, and the Lycee. It has tribunals of first instance and of commerce, and an extensive trade in butter, honey, wax, cotton and linen yarns, lace, earthenware, &c. The industries comprise tanning and preparing leather for boots and shoes, which are largely made and exported, and for gloves, wax bleaching, printing, and the making of stained paper, hats, and agricultural implements. Rennes is the see of a bishop and the seat of a high court of jurisdiction for Ille et Vilaine and several adjacent departments. Pop (1901), 74,006.

RENNET, the prepared inner surface of the stomach of a young calf. It contains much pepsine, and has the property of coagulating the casein of milk and forming curd. It is prepared by scraping off the outer skin and superfluous fat of the stomach when fresh, keeping it in salt for some hours, and then drying it. When used a small piece of the membrane is cut off and soaked in water, which is poured into the milk intended to be curdled.

RENNIE, GEORGE, eldest son of John Rennie, was born in London in 1791, received the early part of his education at St. Paul's School, London, and completed his studies at the Edinburgh University. In 1811 he became associated with his father in business, learned the art of engineering, and took part with his father in many of his great works. In 1818 he was appointed to superintend the machinery of the Mint, and at the death of his father, in 1821, he entered into partnership with his brother, Sir John Rennie, and executed a number of important dock and drainage works. He continued most of the works com-

menced by his father, such as the docks of Woolwich, Chatham, Sheerness, and Pembroke, the breakwater at Plymouth, the harbours of Liverpool, Kingstown, and Holyhead, the London Bridge, canals, &c. The joint operations of the brothers included also many of the great naval works at Sevastopol, Nicolaiev, Odessa, Cronstadt, and in the principal ports of England, besides the construction of different kinds of mills, dredging machinery, conning machinery, steam engines for the war-ships of Great Britain, France, Russia, and other countries, wood and iron ships, and several English and continental railways, &c. In 1845 Sir John retired from the copartnership, and the business of the firm was afterwards carried on by George with his two sons. Rennie was made a fellow of the Royal Society in 1822, and received various other honours. He wrote several treatises, the principal of which are *Experiments on the Strength of Materials*, *The Frictions of Solids*, and *the Frictions of Fluids*. He died March 30, 1866.

RENNIE, JOHN, a celebrated civil engineer, was born at Phantassie in East Lothian in 1761. His father was a respectable farmer, and gave him a good education, first at the school of the place, and afterwards at Dunbar, where he was instructed in elementary mathematics. He subsequently went to Edinburgh, and attended the lectures of Dr. Robinson and Dr. Black on natural philosophy and chemistry. He laboured for some time after this as a workman in the employment of Andrew Meikle, a millwright—a kind of work that suited his genius well, as he had from his very childhood given proof of an astonishing aptitude for the study of machinery. In 1780 he went to Birmingham, being the bearer of letters of introduction to Messrs. Boulton and Watt at Soho, near that city, and by that firm he was afterwards employed in London in the construction of machinery for the Alhoun Flour mills, near Blackfriars Bridge. In London his reputation rapidly increased, until he was regarded as standing at the head of the civil engineers of Great Britain. Among his public works may be mentioned Rainsgate Harbour, Waterloo and Southwark Bridges, across the Thames, the breakwater at Plymouth, and several similar structures, where submarine masonry was carried to great perfection. He superintended likewise the execution of several canals, the Grand Western Canal, extending from the mouth of the Exe to Taunton, the Polbrook Canal, in Cornwall, the Aberdeen Canal, uniting the Don and the Dee, that between Arundel and Portsmouth, and his chief work in connection with inland navigation, the Kennet and Avon Canal, between Bath and Newbury (Berks). The London Docks, the East and West India Docks, the Prince's Dock at Liverpool, and those of Dublin, Greenock, and Leith, of which the last is remarkable for the strength of its sea wall, were all formed from his plans and under his superintendence. Mr. Rennie was remarkable for steady resolution and inflexible perseverance, and was at the same time in the highest degree punctual and steady in all his engagements, and although in some respects a self-taught man, he acquired the respect of the most distinguished men of science and learning in his day, and was elected a member of the Royal Society. His death took place in 1821.

RENNIE, SIR JOHN, younger son of the preceding, was born August 30, 1794, in London, where he also received his education. About the age of sixteen he left school, and, like his brother, began the study of engineering under his father's direction. After being eight years under the tuition of his father he started on an extensive tour through France, Spain, Italy, Greece, Turkey, Asia Minor,

and Egypt, in the course of which he took note of all that was likely to advance him in his profession. When his father died in 1821 he, in conjunction with his brother George, determined to carry on the extensive business thus left in their hands. The civil engineering works of the firm devolved almost entirely upon John Rennie, while George, who excelled in mechanics, superintended that part of the business. He was associated with his brother in most of the undertakings mentioned in the sketch of the life of the latter. (See above.) Sir John made hydraulic engineering a special study, and through his efforts large tracts of land on the eastern coast of England, including part of the Lincolnshire fens, were reclaimed and made extremely productive. He had in hand also at one time a gigantic scheme of reclamation, which would have rescued from the sea about 100,000 acres, but it was only partially carried out. The finest works of the Rennies are their bridges, which may be seen in all parts of England and Scotland. London Bridge is the most massive of them all. On the occasion of the opening of this bridge in 1831 John Rennie was knighted, an honour which his brother declined. After the dissolution of the partnership in 1845 Sir John practised as an architect. He introduced the system of railways in Sweden, made important surveys of the harbour of Oporto in Portugal, and afterwards designed, and in great part executed, the harbour of Ponte Delgada in the Azores, which was one of his latest public works. In 1845 he was elected president of the Institute of Civil Engineers, and he was chairman of the jury of the engineering section at the Exhibition of 1862. He was a member of the Royal and of several foreign societies, besides possessing various other honours. He was the author of several pamphlets on scientific subjects, and an important work on Harbours, which was dedicated to the queen. He was a man of a genial temperament and of scholarly tastes, was a sincere believer in Christianity, and would never allow that it conflicted with science. He died on September 3, 1874. See his *Autobiography* (1875).

RENT, in political economy, is defined by Ricardo to be 'that portion of the produce of the earth which is paid to the landlord for the use of the indestructible powers of the soil. It is often, however, he remarks, 'confounded with the interest and profit of capital, and in popular language the term is applied to whatever is annually paid by a farmer to his landlord.' Malthus defines rent to be 'that portion of the value of the whole produce which remains to the owner of the land after all the outgoings belonging to its cultivation, of whatever kind, have been paid, including the profits of the capital employed, estimated according to the usual and ordinary rate of the profits of agricultural capital at the time being.' The modern theory of rent adopted by political economists is one which is said to have been first propounded by Dr. Anderson in 1737, though the credit of the discovery is generally accorded to Malthus, Sir Edward West, and Ricardo. To the last of these is undoubtedly due the credit of having elaborated the theory. This theory teaches that in newly settled countries where abundant fertile land can be voluntarily occupied, no rent is possible, but that when, owing to the pressure of population and the demand for produce, a price can be obtained for it in excess of what remunerates the cultivator of the most fertile soils—that is, such soils as produce the largest amount of food with the least expenditure of labour—inferior soils are brought under cultivation, and then rent immediately commences on that of the first quality, and the amount of that rent will depend on the difference in the quality of these lands. If

good land existed in a quantity much more abundant than the production of food for an increasing population required, or if capital could be indefinitely employed without a diminished return on the old land, there could be no rise of rent, for rent invariably proceeds from the employment of an additional quantity of labour with a proportionally less return.

Rent necessarily presupposes a demand for the produce of the land. 'No land,' to use the words of J S Mill, who was a follower of Ricardo, 'ever pays rent unless in point of fertility and situation it belongs to those superior lands which exist in less quantity than the demand, which cannot be made to yield all the produce required for the community unless on terms still less advantageous than the resort to less favoured soils.' Land which only yields sufficient to replace the seed and supply the labourers with the bare necessities of life cannot possibly return any rent. The worst land which can be cultivated as an investment for capital is that which, after replacing the seed, affords the labourers the current rate of wages, and leaves a surplus to the capitalist equal to what he would derive from any other investment. From an economical point of view, however, land which only does this yields no rent, and it is laid down as a principle that as long as any of the land of a country which is fit for cultivation, and not withheld from it by any factitious obstacles, is not cultivated, the worst land in actual cultivation pays no rent. Thus by taking the land in cultivation which yields the least return to the labour and capital bestowed on it, giving only the ordinary profit of capital without leaving anything for rent, a standard is afforded for estimating the amount of rent which will be yielded by all other lands. Whatever is in excess of this is what the farmer can afford to pay as rent to the landlord. Objection is taken to the Ricardian theory on various grounds. It is objected that no landowner would allow his land to be occupied without payment of rent, and on that ground it is denied that there can be any land in cultivation which pays no rent. Land, however, of this nature, it may be replied, might be and often is cultivated by the landlord himself, or by those on whom he may bestow it in charity, and it is also frequently included in large farms, and cultivated along with the better class of soils. In the latter case, though the rent is paid nominally for the whole farm, it is calculated on the more productive parts only, and the other parts virtually pay no rent. The objection that the theory does not meet the case of a territory where all the land is of equal fertility is easily answered. In such a case the rent would be determined not indeed by the fertility of the soil, since there would be no difference in that, but by the vicinity to the markets. Those lands nearest to the markets would of course be more remunerative than the more distant ones, as the expense of transporting the produce would be less, and they would yield a rent equivalent to the advantage possessed, and the land yielding no rent would then be not the least fertile, but the least advantageously situated, which the wants of the community required to be brought into cultivation. It is not, moreover, denied by the theory that in certain cases all the land of an equally fertile country might pay rent. Facts, it is true, do not always correspond to the theory of rent, and it does not appear to account for all the causes which affect the rises and falls of rent. The remarks of Mill on this point are worthy of attention. 'Prices,' he says, 'may range higher or lower during the currency of a lease than was expected when the contract was made, and the land therefore may be over or under rented, and even when the lease expires the landlord

may be unwilling to grant a necessary diminution of rent, and the farmer, rather than relinquish his occupation, or seek a farm elsewhere when all are occupied, may consent to go on paying too high a rent. Irregularities like these we must always expect, it is impossible in political economy to obtain general theorems embracing the complications of circumstances which may affect the result in an individual case. When, too, the farmer class, having but little capital, cultivate for subsistence rather than for profit, and do not think of quitting their farm while they are able to live by it, their rents may be forced up by competition (if the number of competitors exceeds the number of farms) beyond the amount which will leave to the farmer the ordinary rate of profit.'

Similar principles to those which apply to agriculture apply also to trade. The competition for favourable sites to be employed for trading purposes creates a rent, partly because the available area is necessarily limited, and partly because the advantage of one site is so much greater for business purposes than another, that the owner of the soil is enabled to share in the gross profit yielded by the business. Thus the rents are always in proportion to the advantages afforded by the locality for the conduct of business. The fertility of a business site is accidental, no doubt, but it is an accident which affects the land, not the business, and hence, however originated, it is of the same nature with the natural fertility of land capable of cultivation.

RENT, in English law, is the consideration given to the landlord by a tenant for the use of the lands or subjects which he possesses under lease. There is no necessity that this should be, as it usually is, money, for spins, capons, horses, corn, and other things, may be, and occasionally are, rendered by way of rent, it may also consist in services or manual operations, it must, however, issue out of the thing granted, and not be part of the land or thing itself. It is incidental to rent that the landlord can distrain—that is, seize and sell without any legal process—the tenant's chattels, or indeed any goods found on the premises, even if they do not belong to the tenant, in order to liquidate the rent. However, by act 34 and 35 Victoria, cap. LVIII, passed in 1871, the goods of lodgers are protected against distresses for rent due to the superior landlord. Sometimes the owner transfers to another by deed or otherwise the right to a certain rent out of the lands, this is termed a rent charge, and the holder of it has power to distrain for the rent, though he has no right over the lands themselves. Without an express agreement to the contrary the tenant is bound to continue the payment of his rent, though his premises may be destroyed by fire, and the landlord refuse to rebuild them. But a tenant is not to repair damages by tempest, lightning, or other natural casualty, unless there is a special agreement to that effect between him and the landlord. When a lessor covenants to repair, and neglects to do so, the lessee may repair, and deduct the expenses out of the rent. In the absence of an express stipulation in writing the tenant cannot set off any debt due to him by the landlord and deduct it from the rent. Rent is not due till midnight of the day upon which it is reserved, although sunset is the time appointed by law to make a proper demand of it. Where rent is reserved generally, and no mention is made, as is usual, of half yearly or quarterly payments, nothing is due until the end of the year. Rent takes the precedence of every other debt, but in the case of the death of the tenant rent in arrear is held to be of equal degree and is payable along with specialty debts. In Scotland the law as to rent is in general

substantially the same as in England, but the landlord's power of sequestration differs from the power of distress. See LANDLORD AND TENANT.

RENUNCIATION, in law, the act of giving up a right. In England it is applied to the act of an executor who declines to take probate of the will of his testator. By 20 and 21 Victoria, cap lxxvii, it is provided that, after 1st January, 1858, where an executor renounces probate of the will, his right to act as executor shall wholly cease. Likewise, when ever by death or otherwise an executor fails to appear, when cited to take probate, his right shall cease and go in like manner as if he had not been appointed. In Scotland there are three applications of the term. (1) Renunciation by an heir, where, rather than enter upon the property to which he is entitled, and thus become liable for the encumbrances upon it, the heir prefers to renounce his character of heir. (2) Renunciation of redeemable rights, which may be either rights of property or rights in security. Where the deed conveys a right of property, and the right has remained personal, no sasine following, a renunciation will sufficiently extinguish the right. Where the deed conveys a right in security only, as in the case of an heritable bond, a simple discharge and renunciation is sufficient to extinguish the creditor's sasine. (3) Renunciation of a lease, which is used in the same sense as the surrender of a lease in England. It may either be verbal or by a written deed, in the former case it may be resiled from, in the latter it cannot.

REPAIRS, in law, is the term denoting the repairs done to a house or tenement by the landlord or tenant during the currency of a lease. In England, unless there is an express stipulation to the contrary, repairs fall to be performed by the tenant, but it is usually stated in the lease who is to do the repairs. A tenant is not bound to repair damages by lightning or other natural casualty unless he has specially agreed to do so. If a tenant covenants to repair generally without an express exception, and the premises are burned down, he is bound to rebuild them. In the lease of farms the tenant is bound only to keep the house in repair, also the fences but not the out buildings. In Scotland the landlord is bound at common law, independently of stipulation, to make all necessary repairs, and if he fails to do so, the tenant may make them himself, and deduct the amount from his rent. In tenements within a royal burgh, where a considerable sum is required for the necessary repairs, which the landlord is unwilling to grant, it is customary for the tenant to apply to the dean of guild, whose warrant, proceeding on the estimate of tradesmen, is evidence both of the necessity and amount of the expense of repairing. When all necessary repairs have been effected at the commencement of the lease the tenant is bound to keep the premises in ordinary repair himself.

REPEATING PISTOL. See REVOLVER.

REPLEVIN, in English law, is a personal action *ex delicto*, brought to recover possession of goods illegally seized, the validity of which seizure it is the regular mode of contesting. The term denotes a redelivery to the owner of the pledge or thing taken in distress.

REPORTING, PARLIAMENTARY, is the process by which the debates in Parliament are made known to the nation. Previous to the year 1711 no regular publication of reports can be said to have been made. Accounts, however, of single speeches, and sometimes of entire debates, were not uncommon, and these have come down to us from a very early date. In the earlier volumes of the journals of the House of Commons short notes of speeches are to be found,

but these were made by the clerk without the authority of the House, and were subsequently discontinued. Reports of the parliaments in the reign of Elizabeth were made by Sir Symonds d'Ewes, and occasional notes of some of the later parliaments were taken from time to time, but in a very desultory style. Valuable information of this description will be found in the work entitled *The Parliamentary History of England*, and in Rushworth's *Remarkable Proceedings in Parliament*. For a long time the publication of parliamentary debates was fettered by many restrictions. Under the Long Parliament a speech could not be published without the authority of the House, that is, of a majority in the House, which would hardly be likely to grant the right to its opponents. In 1698 the Lords agreed to a standing order which is still unrepealed, declaring 'that it is a breach of the privilege of this House for any person whatsoever to print, or publish in print, anything relating to the proceedings of the House, without the leave of this House.' After 1711 speeches reproduced from notes furnished sometimes by the members themselves began to appear regularly in periodicals. *Boyer's Historical Register*, an annual publication, gave a pretty regular account of the debates from the accession of George I to the year 1737. In 1735 the *Gentleman's Magazine* began a monthly publication of the debates, but the reports were necessarily very inaccurate, as may be judged from the manner in which they were got up, which is thus described by Sir John Hawkins—'Taking with him a friend or two he (Cave, the publisher) found means to procure for them and himself admission into the gallery of the House of Commons, or to some concealed station in the other house, and there they privately took down notes of the several speeches, and the general tendency and substance of the arguments. Thus furnished, Cave and his associates would adjourn to a neighbouring tavern, and compare and adjust their notes by means whereof, and the help of their memories, they became enabled to fix at least the substance of what they had lately heard and remarked. The reducing of this crude matter into form was the work of a future day and an abler hand—Guthrie the historian, whom Cave retained for the purpose. Dr Johnson was afterwards engaged by Cave in the composition of the parliamentary debates. These debates were never published till after the prorogation of Parliament. A transparent veil was thrown over this breach of the standing order by disguising the names of the speakers, or more commonly by printing only initial and final letters. In 1729 it was resolved by Parliament 'That it is an indignity to, and a breach of the privilege of, this House for any person to presume to give in written or printed newspapers, any account or minutes of the debates, or other proceedings of this House or of any committee thereof, and that upon discovery of the authors, &c, this House will proceed against the offenders with the utmost severity.' In 1788 the speaker himself brought up the subject for consideration, and the resolution of 1729 was repeated in nearly identical terms, not, however, till after a debate, in which, though no one undertook to defend the practice, the danger of impairing the liberty of the press was strongly insisted upon. This interdiction, however, was far from putting a stop to the publicity given to the proceedings of Parliament, and only served to make matters worse. For though the debates continued to be published more sedulously than ever, they were given in a form which was likely to make Parliament regret the resolution it had passed. They were mutilated, falsified, and interspersed with venomous allusions, the Parliament was dubbed with the title

of Senate of the Great Lilliput, or the Political Club, and the orators were alluded to under the names of Cæsar, Mark Antony, Brutus, and the like. In 1747, Cave, the editor of the *Gentleman's Magazine*, was brought to the bar for publishing the debates of the House, but upon his denying that he retained any person in pay to make speeches, and expressing his contrition, he was discharged on payment of fees. In 1768 the regulation for the non-publication of debates was enforced with almost unparalleled strictness. The rigid enforcement of the standing order for the exclusion of strangers was continued from 1768 to 1774—the whole period of the duration of what is hence known as the 'Unreported Parliament,' a designation, however, not strictly accurate, for Cavendish, one of the members, devoted himself to taking an outline of the speeches, and these form the foundation of the collection edited by Wright, under the title of 'Sir Henry Cavendish's Debates.' In 1771 a keen contest took place between Parliament and the press on the question of parliamentary reportings. On the 8th of February Colonel Onslow complained to the House of Commons that two newspapers had printed a motion he had made and a speech against it, and more over, had called him 'Little Cocking George.' The printers of these papers, Thompson and Whible, were ordered to appear before the House, and when they could not be discovered, the House addressed the king for the issue of a royal proclamation for their apprehension, which was accordingly done. On the 12th of March Onslow was determined to bring the matter to an issue, and moved for the apprehension of six other printers. A keen debate ensued, but the motion was carried. Four of the printers obeyed the orders of the House, made their submission, and were discharged. An order for the apprehension of another printer, Miller of the *London Evening Post*, took a more serious turn, and resulted in a conflict between the Corporation of London and Parliament on a question as between law and privilege. The lord mayor and Alderman Oliver were committed to the Tower, where they remained till the prorogation of Parliament, which always suspends the power under which the privilege of committal is exercised, and in the ensuing session neither the dispute with the city nor the struggle with the printers was renewed. In a speech in the House of Peers Chatham declared that the dissatisfaction of the people 'had made them uncommonly attentive to the proceedings of Parliament. Hence the publication of the parliamentary debates. And where was the injury if the members acted upon honest principles? For a public assembly to be afraid of having their deliberations published is monstrous, and speaks for itself.' It was some years, however, before these principles were recognized, but the triumph of the printers in 1771 led the way to the complete establishment of that system of reporting which has rendered the newspaper press of Great Britain the clearest mirror of the aggregate thought of a reflecting people. But it was only by a very gradual process that this advanced stage was reached. The process was greatly accelerated, however, in 1815, when the close of the American war withdrew the attention of the nation from foreign to home affairs, and as these centred in Parliament the reporting of parliamentary debates became a matter of great importance. A few years afterwards, with the increased attention bestowed upon it, the system reached its full development. Among other inconveniences which the reporters had at first to submit to was the want of any special place in the House for themselves, no privilege was accorded to them more than was granted to any other strangers. On one

Vol. XII

occasion, when an important speech was expected from Pitt, then prime minister, an unusual number of strangers were attracted to the gallery set apart for them in the House, and filled it, to the exclusion of the whole body of the reporters. The consequence of this was that no report of the speech appeared in next morning's papers, but it had also the effect of placing the reporters on a more advantageous footing for the future, as steps were immediately taken to have a bench in the gallery with a special door fitted up for their exclusive use, and to this was added shortly afterwards the reporter's room. Similar accommodation was provided in the Upper House. In the new houses of Parliament special galleries and rooms have been fitted up for the reporters, and every precaution taken to provide all necessary conveniences for the corps.

A single newspaper requires a large staff of reporters, as they have to relieve each other at regular intervals—usually every quarter of an hour. One reporter takes his place in the gallery, where he remains taking notes for say fifteen minutes, when he is relieved by another reporter, he then retires to the reporter's room, transcribes his shorthand notes, which takes him some time to do, and is then ready to proceed again to the gallery, repeating the same process till the House rises. There is thus always one reporter in the House, while the rest are transcribing their notes, and in this way the printing of the speeches may be proceeding even while they are in course of delivery, if they are very long. Instances are given of the proof sheets of the greater part of a speech being placed in the hands of the speaker of it as soon as he has resumed his seat. By means also of the electric telegraph, introduced into the Houses of Parliament, provincial papers are placed in the same position with regard to freshness of reports as the metropolitan ones.

Notwithstanding the facilities that have thus been given for parliamentary reporting with the full cognizance of the House itself, and notwithstanding the expectation and desire of members to see their speeches reported in the newspapers, the standing order that renders this proceeding illegal still remains unrepealed, and the power to exclude the public and the reporters from the House has been exercised on more than one occasion within comparatively recent times, though, in November, 1868, by the verdict for the defendant in the case of *Wason v. The Times* (for libel), reports of parliamentary debates were decided to be privileged. In the year 1875, however, the matter was put on a somewhat more satisfactory footing. On the 27th of April in that year a member called attention to the presence of strangers in the House. The House had to be cleared, but a resolution was passed to suspend the standing order during that sitting, and the strangers, among whom was the Prince of Wales, after being turned out, were allowed to return. A few days afterwards another member 'spied strangers' in the House. This time the debate was adjourned, and it was seen that some method must be devised to prevent a recurrence of similar proceedings. After a lengthened debate a resolution moved by the premier, Mr. Disraeli, was carried on the 31st of May with regard to the exclusion of strangers from the House, which was to the effect that the speaker should put the question that strangers should withdraw, without permitting debate or amendment, the majority deciding, and that he should have power to exclude strangers in the event of disorder. The final decision in the matter is thus no longer left to the caprice of a single member, though he has it still in his power to impede the business of the House so far as to cause a division.

By means of the system of parliamentary reporting now practised in the United Kingdom, which places

every one who chooses to read a newspaper in possession of the proceedings of the great assemblies of the nation, Parliament is brought into closer relation with the people, and becomes more truly representative, which is its proper character, than could be hoped for under different circumstances. Legislative measures are fully ventilated, and become moulded in great part by public opinion before they pass into law. It would indeed be a hardy proceeding of Parliament to pass a measure which in its preliminary stages met with the general disapprobation of the nation. There is thus little likelihood of the recurrence of those contests between Parliament and the people which are to be met with so frequently in the annals of the nation. 'It is almost impossible,' says Hallam, 'to overrate the value of the regular publication of proceedings in Parliament.'

It tends manifestly and powerfully to keep within bounds the supineness and negligence, the partiality and corruption to which every Parliament, either from the nature of its composition or the frailty of mankind, must more or less be liable. Perhaps the constitution would not have stood so long, or rather would have stood like a useless and untenanted mansion, if this unlawful means had not kept up a perpetual intercourse, a reciprocity of influence, between the Parliament and the people. A stream of fresh air, boisterous perhaps some times as the winds of the north, yet as healthy and invigorating, flows in to renovate the stagnant atmosphere, and to prevent that malaria which self interest and oligarchical exclusiveness are always tending to generate.

In most of the continental countries official shorthand reporters are appointed by the government, and their reports may be published in the journals, under certain restrictions. In France until 1852 the journals were allowed to report the debates in the legislative chambers, the only restriction imposed being that they should reproduce them fully and faithfully, and abstain from the use of offensive language towards the chambers or their members on pain of punishment. Few journals, however, gave anything like faithful reports, and the constitution of 15th January, 1852, decided that thenceforth the report (*compte rendu*) of the sittings of the Corps législatif by the journals should consist solely in the reproduction of the official report issued under the eye of the president. This measure proved disastrous to the political life of the nation during the eight years it was enforced. In 1860, the state of matters having become intolerable, a measure, which, however, did not improve matters much, was passed by the senate, that the publication of reports should consist in the reproduction of the debates inserted *in extenso* in the official journal or as published under the authority of the president. In 1868 seventeen journals were prosecuted for a breach of this decree. A keen discussion took place in the Assembly on the propriety of modifying the law, but it was decided that there should be no other report of the proceedings of the chambers than the official one, and under the republic the same system continued. In the United States no restriction is placed upon the reporting of the debates in the legislative assemblies, but members frequently complain of the small space devoted by the press to reports of their speeches.

REPORTS, in law, comprise the decision on legal issues, which are preserved as authentic records in the archives of the several courts. These are published from time to time, and are invaluable to the lawyers, containing, as they do, a history of the several cases, with a summary of the proceedings, which are preserved at length in the record, the argument on both sides, and the reason the court gave for its judgment. In England the reports are extant from the

reign of Edward II. Up to the time of Henry VIII. the reports were taken officially at the expense of the government, and published annually under the denomination of Year books, but afterwards, until so recently as 1865, the reports were made by private individuals in the various courts, the incompetency of many of whom for the task is rendered but too apparent by the contradictory character of some of the reports. In 1865 an improved system of law reporting was instituted by the bar under the superintendence of the Council of Law Reporting, since incorporated. The term reports is also applied to certificates from the masters of the courts when the courts make reference to them concerning matters of account, &c., or from committees of either House of Parliament.

RELPOUSSÉ, a kind of ornamental metal work in relief. It resembles embossed work, but is produced by beating the metal up from the back, which is done with a punch and hammer, the metal being placed upon a wax block. By this means a rude resemblance to the figure to be produced is formed, and it is afterwards worked up by pressing and chasing the front surface.

REPRESENTATIVE GOVERNMENT is that form of government in which either the whole of a nation or that portion of it whose superior intelligence affords a sufficient guarantee for the proper exercise of the privilege is called upon to elect representatives or deputies charged with the power of controlling the public expenditure, imposing taxes, and assisting the sovereign in the framing of laws. The denomination, however, would be a misnomer in a country in which the liberty of the press was not guaranteed and entire publicity given to the proceedings of the representative assemblies, for only in possession of these liberties could the government be regarded as truly representative, then alone could the representatives and the represented exercise that reciprocal influence upon each other necessary to the subsistence of the relation. Doubtless this form of government is exposed to dangers, as history abundantly demonstrates, but at the same time it is the only form under which the liberties of the subject can be fully maintained. The only other form of government possible would be a despotism, and who would not exclaim with the Polish patriot, 'Malo periculosam libertatem quam tutum servitium' (I would rather liberty attended by danger than slavery attended by security). See CONSTITUTION.

REPRIVE, the suspension of the execution of the sentence passed upon a criminal for a capital offence. A reprieve may be granted in various ways.—First, by the mere pleasure of the sovereign, but this is most commonly done only when the judge recommends the criminal to the sovereign's mercy, which he generally does when not satisfied with the verdict, or when the evidence is suspicious or the indictment insufficient, or when any favourable circumstance appears in the criminal's character. When the judge so recommends the prisoner he grants the time necessary to apply to the crown for entering an absolute or conditional pardon. Second, a reprieve may be granted from natural causes, as where a woman capitally convicted pleads pregnancy. In this case the judge directs a jury of twelve matrons or discreet women to inquire into the fact, and if they bring in a verdict of *quick with child* the execution is stayed either till she is delivered or until it is shown in the course of nature that she had not been with child at all. Another cause of reprieve is the insanity of the offender between the judgment and execution, for though a man be sane when he commits a crime the sentence cannot be executed upon him if he becomes insane after judgment.

REPRISALS, LETTER OF See LETTER OF MARQUE

REPRODUCTION, the function which secures the continuance of life from generation to generation or the process by which living creatures produce others like themselves. In fact, the power of reproduction is one of the insignia of vitality, distinguishing the animate from the inanimate material system, though crystals may be said to 'grow', and even to replace lost parts, they cannot be credited with reproductive powers comparable to those of living creatures. One of the fundamental facts in regard to reproduction is that, so far as we know, an organism always arises from a parent or from parents of more or less similar character, as a statement of fact, the aphorism '*omne vivum ex vivo*' holds absolutely true as opposed to unverified allegations as to the occurrence of spontaneous generation. Even more important nowadays is the fundamental idea of genetic continuity in the great majority of cases new individual life arises from a fertilized ovum which re-embodies the protoplasmic organization or germ plasma of the fertilized ova that gave rise to the parents.

Modes of Reproduction—There are many different modes of reproduction and they may be arranged in various ways, which are equally valid. Thus, if we make a sharp contrast between unicellular and multicellular organisms we see that in the former reproduction *e.g.* in bacteria, may occur (a) by division into two more or less equal and identical parts (b) by budding, which is a modified form of division, in which the parent can be distinguished from the daughter cell or cells, *e.g.* in yeast, and (c) by sporulation or rapid division into many units which are at first confined within the parent cell *e.g.* in sporozoa. In these unicellular organisms the reproduction may be wholly asexual, (1) in the sense that there is nothing corresponding to sexual union (fertilization or amphimixis), or (2) in the sense that

- | | |
|---|---|
| A Without special reproductive elements | { Division budding, &c., in most unicellulars
Division budding, &c., in some multicellulars |
| B With special reproductive elements | { More or less distinct specialization of reproductive elements in some unicellulars
Specialized ova and spermatozoa in most multicellulars
Formation of spore cells in some multicellulars |

If we lay emphasis on the occurrence or non occurrence of amphimixis or fertilization, the classification of the modes of reproduction would read as follows—

- | | |
|----------------------------------|--|
| I Without any form of amphimixis | { A Without special reproductive cells—division, budding &c., in most unicellulars and in some multicellulars
B With special reproductive cells—formation of spores in some multicellulars, and parthenogenesis |
| II With some form of amphimixis | { A Without specialized reproductive elements—amphimixis occurs in most unicellulars
B With specialized reproductive elements, amphimixis occurs in a few unicellulars and in most multicellulars |

Alternation of Generations—But though the above classifications may seem at first sight complex, they do not exhaust the actual occurrences. Thus, there is in many forms what is called alternation of generations—the alternative occurrence in one life cycle of two (or more) different forms differently produced. The sedentary, vegetative, asexual hydroid may bud off free swimming sexual medusoids, whose fertilized ova develop into embryos which eventually settle down as young hydroids. The familiar fern plant—entirely sexless—produces spores which develop into prothalli with male and female organs (antheridia and archegonia), and from the fertilized egg cells of these the sexless fern plants again arise. Sometimes in ferns the sexual generation or gamophyte is suppressed (apogamy), and in higher plants it is always reduced to a minimum, sometimes in ferns the spore producing generation or sporophyte is suppressed (apospory), this is a source of further complications, and analogous conditions are known elsewhere.

Fixing attention upon the typical process of sexual

there are no special germ cells. But in many unicellular organisms, *e.g.* ciliated Infusorians and some sporozoa, there are elaborate processes of fertilization, and in some colonial forms, *e.g.* Volvox, there is a definite beginning of egg cells and sperm cells. The fact is, that no hard and fast line can be drawn.

In the simplest cases a single celled organism may divide into two or more parts, each of which regrows the whole, in some cases, *e.g.* where a colony of zoophytes is formed by repeated budding, the reproduction may be described as a specialized mode of overgrowth whereby surplus material is utilized to start new individuals, when buds are set adrift from the present body the reproduction may be described as discontinuous growth, but in the great majority of cases the beginning of a new life is in the union of two sex cells (or gametes), the ovum and the spermatozoon.

Secondly, in multicellular organisms we may distinguish (1) reproduction *without special germ cells*, *e.g.* by division of the body, as in some sea anemones, or by giving off buds, as in some fresh water worms, like Nais, and here too the frequent possibility of multiplication by artificial cutting should be noticed. Commoner, however, is (2) reproduction *by means of special germ cells*, in which (a) the eggs from one parent are fertilized by sperms from another parent (heterogamy) or (b) eggs from one parent are fertilized by sperms from the same (hermaphroditic) parent as in tape worms, liver flukes, some nematodes, and various plants (autogamy), or (c) the eggs may develop without fertilization (parthenogenesis) as in many Rotifers. Moreover, a multicellular organism may also multiply by spore cells—specialized germ cells yet hardly equivalent to eggs—which require no fertilization.

If we lay emphasis on the presence or absence of special reproductive elements, the classification of the modes of multiplication would read as follows—

classification of the modes of reproduction would read as follows—

reproduction, we may briefly sum up the present-day aspect of some of the most important occurrences.

Origin of the germ cells—The germ cells, or essential reproductive elements in a multicellular organism, are the lineal descendants of the fertilized ovum which gave rise to that body, and they owe their unique power of reproducing to the fact that they have not shared in the differentiating processes of body making, but have, through early insulation or otherwise, been able to retain in intact integrity the organization of the parent egg cell. Sometimes the distinct germ cell lineage is demonstrable, often it is not, but in either case the only sufficient interpretation is that implied in the idea of germinal continuity—that a germ cell is what it is, with its marvellous potency of development, because it has retained undisturbed the protoplasmic organization or germ plasma characteristic of the fertilized ovum from which it is descended.

Maturation of the germ cells—By intricate processes, still incompletely reduced to order, there occurs in the history of the egg cells and sperm-

cells within the body a process of nuclear reduction, as the result of which each ripe egg and each ripe sperm has *half* the number of nuclear bodies or chromosomes characteristic of the ordinary body cells of the species. If each cell of the body has sixteen nuclear rods or chromosomes—the number is constant for each species or variety—then the ripe germ cell has eight. Thus it comes about that when egg cell and sperm cell unite in fertilization, the number of chromosomes characteristic of the species is restored, and not doubled, as it would be if no reducing process took place.

Fertilization—In many different ways throughout the series of living creatures the spermatozoa are brought into the vicinity of the ovum, but the final event—the process of fertilization—always implies the intimate and orderly union of the ovum nucleus and the sperm nucleus. It may take place outside of the body, as in the salmon, or immediately after the eggs are liberated, as in the frog, or within the body, as in reptiles, birds, and mammals, but the gist of the process is always the same. There seems to be, on the one hand, a mingling of the hereditary qualities of the two parents, and, on the other hand, there seems to be some stimulus supplied by the spermatozoon to the ovum and prompting development. As a fraction of an egg even without a nucleus may in some cases (as urchin, the mollusc *Dentalium*, the worm *Lancea*) be fertilized and may develop into a larva (microgony), it is plain that the ovum nucleus is not absolutely essential (though for practical purposes indispensable), as an egg may develop without being fertilized (as in normal parthenogenesis in backboneless animals) or as the result of artificial stimulation (in sea urchins, &c.), it is plain that the sperm nucleus is not absolutely essential (though for practical purposes indispensable except in established cases of parthenogenesis), indeed there can be no doubt that each germ cell or gamete carries with it a complete potential organization. Since the ovum is much larger than the spermatozoon which enters it, the cell substance of the future embryo is at first mainly due to the mother; the two parents are alike in contributing an equal number of nuclear rods or chromosomes, usually believed to be the vehicles of the hereditary qualities, the stimulus inducing the division of the egg and the precise partition of the maternal and paternal inheritance between the daughter cells seems to come from the father. What Huxley suggested in 1878 has been to some extent proved. 'It is conceivable, and indeed probable, that every part of the adult contains molecules derived both from the male and from the female parent, and that, regarded as a mass of molecules, the entire organism may be compared to a web, of which the warp is derived from the female and the woof from the male.'

The essential process of fertilization should be distinguished from more external preliminaries, e.g. that whereby spermatozoa are in some cases transferred from the male to the female animal (insemination), or that whereby the pollen grains or microspores of flowering plants are transferred from stamens to carpels (pollination). While it is still common to speak of staminate flowers as male, and pistillate flowers as female, there can be no real understanding of the flower unless it be clearly recognized that both stamens and carpels are in the first instance spore producing organs, the truly sexual generation being reduced to a minimum.

Parturition—(1) In most animals the eggs are hatched outside of the mother's body, as in birds and to this the by no means fortunate term *oviparous* is applied. In these cases fertilization may be internal, as in birds or external, as in most bony fishes, and in the former case the egg has often passed

through part of its development before it is laid. (2) In most mammals the developing egg is fixed to the wall of the womb or uterus, and there undergoes development usually for months (the period of gestation), being bound to the mother by an intricate structure (the placenta), which admits of the passage of food and oxygen from the mother to the virtually parasitic fetus, and of waste in the opposite direction. This condition is known as *viviparous*, but it should be noticed that the three lowest mammals (duck-molt and spiny ant-eaters) are oviparous, that the union between mother and unborn offspring is neither typical nor very perfect in most marsupials (which have a very short gestation, and bring forth their young as it were prematurely), and that there are hints of something approaching to placental union in two or three fishes and lizards. In fact here, as elsewhere, there are no hard and fast lines. (3) For other cases, where the egg is hatched within the body, but where no placental union is established, as in some sharks, lizards, snakes &c., the awkward term *ovo viviparous* is employed. As oviparous and ovo viviparous modes of parturition may occur in nearly related, or even in the same forms (e.g. the grass snake), it must be recognized that the distinction is only one of degree.

Reproduction and Life of Producers—In regard to the relation of the reproductive function to the general life of the producers, a few important facts may be briefly noticed. (1) There is an intimate correlation between the life of the general body or 'soma' and that of the reproductive organs or gonads. Thus, in a manner which is as physiologically obscure as the fact is certain, an influence passes at puberty, at sexual maturity, at conception, and at other crises, from the reproductive organs to the remote corners of the body. Disease in or removal of the gonads may radically affect the growth of particular bodily structures, as is well seen in the case of the antlers of stags. Conversely, the health and nutrition of the body may have a marked effect on the vigour of the gonads, and may have an *indirect* effect on the germ cells and the future offspring. (2) There is a marked antithesis between growth and multiplication, between nutrition and reproduction. Thus, most higher plants have a long vegetative period, and then suddenly burst into flower, checks to nutrition, such as root pruning, favour reproductive vigour, castration or removal of the reproductive organs may be followed by an exaggerated development of various parts of the general body, both in plants and animals. (3) Reproduction tends to occur at the limit of growth, and in many of the lower organisms it is literally the beginning of individual death. Some worms rupture in reproducing, in many insects the origin of new lives is followed by the death of the parent, even as high up as lampreys and eels death seems to follow as the nemesis of reproduction, and that many plants die after flowering is familiar to all. There are throughout the organic series many adaptations which tend to lessen the vital expensiveness of reproduction. (4) There is a rhythmic or seasonal character in the reproductive activity of many organisms. In mammals there is sometimes a well defined sexual season (the particular time or times of year during which the sexual organs exhibit special activity), this may be marked by 'rutting' in the males and by 'heat' in the females. Stags have in natural conditions a limited rutting season, but it is interesting to notice that Wapiti stags in the Zoo rut all the year round except during the casting and regrowth of the antlers. In females which show a sexual season, there are four periods, constituting 'an anæstrous cycle'. (1) There is a *pro oestrus*

period of 'coming in season', (2) an oestrus or climax ('heat' season, 'brim', &c) during which coition may be followed by conception, (3) if conception do not occur, a period of metoestrus during which the activity of the reproductive organs gradually subsides, and (4) a fallow, resting period, or anoestrus. Sometimes the metoestrus is followed not by an anoestrus, but by a brief dioestrus, usually lasting but a few days, and Heape distinguishes monoestrus mammals, like wolves, which experience a single oestrus during each sexual season, from polyoestrus mammals, like mares, whose sexual season is occupied by a series of dioestrus cycles. When insemination and fertilization occur at the climax, gestation results, and after parturition there may be an interval of rest, even beyond an anoestrus cycle, or, on the other hand, parturition may be followed, as in rabbits, almost immediately, and in spite of the nursing period, by pro-oestrus, oestrus, insemination, and renewed gestation. There is much to be said in support of the view that 'heat' and menstruation (which occurs in some Primates as well as in Homo) are analogous phenomena, and there is no doubt that the rhythm of reproductive activity is, or originally was, correlated with seasonal changes. But just as there are some organisms, such as man, whose sexual season has practically come to be co-extensive with the year, so there are others, such as many birds, *eg.* finches, where the sexual season is very strictly limited to a brief period, after which even the essential organs (ovary and testis) dwindle to a minimum. Among lower animals the *Palolo* worm is particularly noteworthy for the seasonal punctuality of its reproductive period, but the same is true of many plants. A convenient introduction to the subject will be found in *The Evolution of Sex*, by Professor P. Geddes and J. Arthur Thomson (4th ed. 1901), and the same work includes an abundant bibliography. As bearing on the subject see also the articles *GENERATION, PARHENOGENESIS, SEX, HEREDITY, EVOLUTION, SPECIES, &c.*

REPTILES, or REPTILIA a class of Vertebrate animals included by some in the Abranchiate group of the sub-kingdom Vertebrata, which group is distinguished by the fact that the breathing is conducted throughout life by means of lungs, gills or branchiae having no share in the respiration of Abranchiate forms. In Huxley's System of Classification the Reptiles are included with the Aves or Birds to form the province Sauropsida or 'Lizard-like Vertebrata', and although no two groups of animals to the popular mind might appear more dissimilar than Reptiles and Birds, the naturalist must give his assent to the arrangement of Huxley from a consideration of the near structural affinities of these forms. It may therefore be well to notice, firstly, the chief points in which Reptiles and Birds agree, and in the next place to note those characteristics in which they differ, or, in other words, to clearly define the class before us. The Sauropsida—Reptiles and Birds—are distinguished by the possession of lungs, gills being absent. The embryo possesses an amnion and allantois, the former being a sac investing the young animal, the latter being a structure developed from the lower surface of the embryo, and serving for the respiration of the young animal, part of it being ultimately converted into the urinary bladder of the embryo. The amnion and allantois also exist in mammals, the former being well known as the bag or sac which contains the fetus and which bursts at parturition, while the latter contributes to form the umbilical cord and placenta. (See NAVEL, PLACENTA.) The lower jaw in Sauropsida is of compound nature, in that each half or ramus consists of a number of distinct pieces, whilst in Mammals each half consists of but

a single piece. The lower jaw in Reptiles and Birds further articulates with the skull, not directly or of itself, but through the intervention of a separate and distinct bone the *os quadratum* or *quadrate bone* (which see). The red blood corpuscles of Sauropsida are oval and nucleated, that is, each corpuscle contains within it a smaller and central particle, the *nucleus* (which see). The skull is joined to the spine by *one condyle* only, borne on the occipital or hinder bone of the skull, *two* such condyles existing in Amphibians and Mammals (which see). An exoskeleton or skin skeleton is always developed. The ankle joint is placed in Sauropsida not (as in Mammals) between the *tibia* or shin bone and the *astragalus* or ankle bone, but between the proximal and distal parts of the *tarsus* or instep, which in Sauropsida becomes thus divided. The intestine ends in a *cloaca* or chamber common to the ducts of the alimentary, urinary, and genitive organs. No complete *diaphragm* or midriff is developed to separate the thorax or chest from the abdominal cavity. The halves or hemispheres of the cerebrum or true brain are never united by a *corpus callosum*, no mammary glands exist, and the Sauropsida are oviparous or ovo-viviparous (see REPRODUCTION).

Such are the characters common to Birds and Reptiles. The latter differ from Birds in the following characters, which may therefore be taken as including the definition of the Reptile class. The exoskeleton consists of *horny scales* or of *bony plates* (*scales*), but never of feathers. The blood is *cold*, and two aortic arches (right and left) exist in living Reptilia. The heart is three-chambered in all save the Crocodiles which possess four-chambered heart. But in all Reptiles, without exception, the venous and arterial currents of blood are connected and an impure or mixed blood is thus circulated throughout the bodies of these forms. This incomplete circulation also obtains in Amphibia. The lungs of Reptiles do not present the *open* character of those of Birds (see ORNITHOLOGY), but, like those of Mammalia, are shut and closed sacs. The tarsal and metatarsal bones of the hind limbs, which in birds are united to form a single bone, are distinct and separate in the great majority of Reptiles. When a *sacrum* (see PIVOTS) exists it bears sacral ribs, which articulate with the *ilium* or haunch bones.

These characters map out the class of Reptiles as a distinct class of Vertebrate animals. It is, however, necessary here to notice that by some naturalists the class Amphibia, including the Blind worms, Frogs, Newts, Snails, and their allies, were formerly, under the name of Batrachia (which see), regarded as forming a subdivision of the Reptilian class. This mode of arrangement is hardly sanctioned in modern zoology or on structural grounds since the Amphibia present much nearer affinities to the Fishes than to the Reptiles, and are usually included with the Fishes in the Branchiate group of Vertebrata, or in Huxley's province of Ichthyopsida (which see). We shall follow this latter arrangement in the present instance, and treat the Reptiles as of themselves constituting a defined class, devoting a few words to the Amphibia as a distinct group at the close of this article.

The class of Reptiles is represented by four chief orders of living, and by very many extinct forms. The living forms are the Tortoises and Turtles (*Chelonii*), the Serpents (*Ophidia*), the Lizards (*Lacertilia*), and the Crocodiles and Alligators (*Crocodylia*). (See the accompanying plates.) The extinct Reptilia are included under various groups, such as Ichthyopterygia (*Ichthyosaurus*), Sauropterygia (*Plesiosaurus*), Anomodontia (*Rhynchosaurus*, &c.), Pterosauria (*Pterodactylus*, &c.), and Dinosauria

(*Megalosaurus*, &c.) Some of the extinct reptilian forms were animals of huge size and formidable appearance, and in the Lias and Oolitic rocks they are very characteristic of the life of the period (See *GEOLOGY*.) The extinct *Archæopteryx* was a bird with some marked reptilian characters.

The body in Reptilia is generally of elongated shape, the Tortoises and their allies (see the first plate, fig 1-8) presenting the most notable exceptions to this rule. The limbs may be entirely wanting, as in most snakes (some of which have them in a rudimentary form), or only a pair of limbs may be developed (as in some Lizards—for example, *Chirotes* and *Bipes*), whilst in most other Reptiles all four members are present. The exoskeleton varies greatly in its development throughout the class. As in the Tortoises and Turtles and Crocodiles it may attain, either separately or in combination with the endoskeleton, a high development. In Serpents and many Lizards it is moderately developed, whilst in some Lizards the skin is comparatively unprotected. A distinction between the various groups of Reptiles has been formed on the characters of the body covering, those forms which possess scales alone being named Squamata or Squamate Reptiles, whilst those in which bony plates are developed in addition to the scales (as in Crocodilia) are named Loricata or Loricated Reptiles. The bones of Reptiles evince a structure of a more compact kind than is seen in lower Vertebrata, and it is also notable that in Reptiles the sutures, or lines of union between various bones, have a degree of persistence beyond that in other classes of the sub-kingdom. In the skeleton of Reptilia (fig 9 of Plate I) the five different regions into which the spine is ordinarily divided are to be recognized. The cervical vertebrae generally possess small ribs and incomplete hemal arches. They are usually seven in number. The dorsal vertebra vary in number, and possess ribs, and form complete hemal arches. The lumbar vertebra, or those of the loins, are ribless, and the sacral vertebra, united to form the single *sacrum*, are two in number. The vertebra of the tail are numerous, and under these segments V shaped or chevron bones are situated being attached by loose ligaments. Towards the extremity of the tail the vertebra become modified and of a degraded type. Beneath the atlas or first vertebra of the neck two slender elongated bones are situated which were regarded by Owen as representing clavicles or collar bones. The bones of the shoulder girdle of each side include a *scapula* or shoulder blade and a *coracoid bone*, the latter bone of each side articulating with the *sternum* or breast bone. The fore limbs consist each of a *humerus* (upper arm bone) of the *radius* and *ulna* (fore arm), of three *carpal* or wrist bones, and of five digits. The pelvis contains its three typical elements—*ilium*, *ischium*, and *pubis*. The ischium forms part of the acetabulum or cavity receiving the head of the thigh bone. (See *PELVIS*.) The character already mentioned of the ankle joint being placed between the divided (distal and proximal) portions of the tarsal and metatarsal bones of the hind limbs is to be remembered as one characteristic of the Reptiles as well as of the Birds. But in Birds these bones are united to form the single tarso metatarsal bone (see *ORNITHOLOGY*), whilst in Reptilia these bones are not ankylosed together. In Plate I, fig 1, *a* is the scapula, *b* the coracoid bone, *c* the fore arm, *d* the humerus, *e, f* ossified vertebrae *g* pelvis, *h* tibia and fibula, *i* thigh bone. In fig 9 *a* is the scapula, *b* the humerus, *c* the fore arm, *d* the wrist, *e* the thigh, *f* the tibia. The ribs in Reptiles are always present, but may differ greatly in form and disposition. A character that has been sometimes insisted upon as distinguishing

between the Amphibia and Reptiles is supposed to consist in the fact that in the former class no true ribs are developed. But in Amphibia, whilst the ribs never attain any great development, and may be sometimes altogether undeveloped, some of these forms (for example, *Siren*, *Cæcilia*, &c.) possess distinct ribs. The skull of Reptilia possesses but a single occipital condyle, by means of which it articulates with the spine. This condyle is formed by the basi-occipital and ex-occipital elements of the cranium. The quadrate bone, by means of which the lower jaw articulates with the skull, is firmly fixed to the skull, joining the squamosal part of the temporal bone above. Each half or ramus of the lower jaw itself is composed of various pieces, making this bone of compound nature. The pieces of which it is composed are variously named dentary, angular, surangular, coronoid, splenial, and articular. The two tympanic cavities, or those of the drum of the ear, communicate with each other by means of a special canal, and with the pharynx or back portion of the mouth by a common Eustachian tube, which receives two tubes in turn from each tympanum. The halves of the lower jaw, it must be noted, are in some Reptilia (for example, Snakes) joined together by ligament only, so as to admit of the halves being separated to a considerable extent (fig 10 of Plate II) as in the swallowing of prey of large bulk (see *PHYLOGENY*), whilst other bones of the skull, in connection with the lower jaw and maxillary apparatus (such as the bones of the superior maxillæ and arches of the palate) are also loosely articulated, to favour the distensibility of the mouth. In other Reptilia, again, the halves of the lower jaw are firmly united in front by bony union, as in the case of Mammalia.

The teeth are generally well developed in Reptiles, but in the Chelonians teeth are wanting the jaws, like those of Birds, being simply ensheathed in horn. The Reptilian teeth, like those of lower Vertebrata generally are adapted less for mastication than for merely retaining prey whilst it is being swallowed. Save in the Crocodiles and in some extinct forms the teeth are not implanted in sockets or *alveoli*, but are attached in various ways and by bony union to the jaw bones. Teeth may be borne by bones other than the jaws (for example, palatal bones), and, as seen in the poison fangs of Serpents several of the teeth may be modified for other purposes than for mastication. The teeth vary greatly in number on each side of each jaw, and consist of dentine, enamel, and cement. They are not persistent, new teeth being produced in regular order (as in Crocodiles) from a growing pulp at the base of the socket, the new tooth displacing the old, whilst the number of teeth is thus kept constant during life.

The tongue may be elongated distensible, and bifid, as in many Lizards and Serpents, short, thick, and non protrusible, as in other Lizards, or completely attached and fixed throughout its entire extent as in Crocodilia. Salivary glands are very generally developed. The oesophagus or gullet is usually greatly distensible (as in Serpents), and may be covered (as in Chelonians) with retroverted spines. The stomach is mostly pyriform or pear shaped, and (as in Snakes) may, like the gullet, be capable of great distension. In Ophidia it exhibits an anterior dilated part, with thin walls for receiving nutriment, and a posterior hinder portion with non distensible walls provided with glands, and adapted for digesting the food. In the Crocodile the stomach resembles the gizzard of a grain eating bird in its high muscularity. The intestine is generally short, and exhibits a division into the small and large portions of the bowel, the separation between the small intestine and *colon* or large portion being marked by a

prominent valve, analogous to the ileo-colic valve of man. As in the Iguanas, a distinct cecum may be developed at the beginning of the larger bowel. The rectum (which see) terminates in a cloaca, which is also common to the efferent ducts of the urinary and generative systems. As in the Crocodiles, the cloaca in front dilates into an allantoic cavity in front, the genital orifices being posterior, and situated low in the cloaca. The ureters open in turn below the generative orifices, whilst lowest of all a portion of the cloaca forms the so-called vestibule, and receives the contents of the uro genital portion. The penis or copulatory organ, or clitoris, as the case may be, lies in the vestibule. The aperture of the anus or vent is longitudinal in form in Crocodiles, and transverse in Lizards and Snakes. The liver is always well developed in Reptilia, in the Crocodiles, for example, it is bilobular, and a gall bladder also exists. The pancreas is not in general of large size, and the spleen is present in a perfect condition.

The heart in Reptiles consists of two auricles (right and left) and a ventricle, except in the Crocodilia, in which two auricles and two ventricles are developed. The right auricle may be termed the venous, and the left the arterial or systemic auricle. The ventricle may be more or less completely divided by internal septa or partitions, the separation in the Crocodiles being complete, and resulting in the formation of a four chambered heart. The most constant of these ventricular septa exists between the orifices of the pulmonary vessels and aorta, and it is this particular septum which effects the complete division of the crocodile's ventricle. Two aortae or main arterial trunks exist (see AORTA and BLOOD VESSELS), and are respectively named right and left aortae. These chief vessels wind round the gullet, and unite to form a single and common main trunk for the supply of blood to the system generally. The right aorta, before its union with the left and neighbouring vessel, gives origin to the arteries which supply the head and front extremities, and as the blood supplied to the right aorta is chiefly derived from the lungs, it follows that the head and front members receive purer blood than that sent to the other parts of the system.

But the chief peculiarity in the circulation of all Reptiles consists in the peculiar mixture of arterial with venous blood, which takes place in the common ventricle of the heart in ordinary reptiles, and in the neighbourhood of that organ in the Crocodiles. Although the latter forms possess a four-chambered heart, the circulation is functionally and essentially the same as in other Reptilia possessing three-chambered hearts. The course of the circulation, beginning with the venous or impure blood on its way to the lungs for purification, leads us to note the venous flow being poured by the *vena cava* into the *right* auricle of the heart. The blood is next sent into the ventricle, which also receives from the *left* auricle the pure or arterial blood which this auricle has received from the lungs. In the ventricle, therefore, the venous blood from the system, and the pure or arterial blood from the lungs, are mixed together, and the ventricle, by its contractions, drives this arterio-venous mixture at once to the lungs and through the system. It therefore follows that the system in Reptilia is nourished by an impure or mixed blood, which the ventricle sends out through the systemic blood vessels for the nutrition of the tissues. In the Crocodiles the venous and arterial blood, instead of being mixed within the heart's cavity itself, are mixed in the great blood vessels just after they take origin from the heart. Thus a direct communication exists through the *foramen Panizzae* between the right aorta (or pulmonary artery), which arises from

the right ventricle, and contains venous blood, and the left aorta, carrying arterial blood, and arising from the left ventricle.

This circulation also exists in Amphibia, which, together with the Reptiles proper, present sluggish habits, slow respiration, and a series of vital actions marked by no active conditions demanding a more perfect circulation or highly oxygenated blood. The active bird or mammal in this respect, and with their perfectly separated arterial and venous currents—the body being in these latter forms supplied with pure arterial blood only—present the greatest contrast to the Reptiles and Amphibians. The blood is cold in Reptilia, that is, is but little higher in temperature than the surrounding medium. The red blood-corpuscles are oval and nucleated. The corpuscles of the Crocodile measure in diameter about $\frac{1}{150}$ th inch, those of Snakes measure about $\frac{1}{175}$ th, and those of Lizards about $\frac{1}{180}$ th inch in diameter.

In Reptiles the lymphatic or absorbent system of vessels (see LYMPH) is well developed, and in Lacertilia and Serpents certain peculiar pulsating organs may exist on the lymphatic trunks, and are hence known as *lymph hearts*, or lymphatic hearts. None of these structures exist in Chelonian Reptiles. They are generally situated near the posterior extremity of the body, and also occur in Amphibians and Birds. The function of these lymph hearts appears obviously to be that of circulating or propelling the fluid contained in the absorbent vessels. No valves exist in the lymphatics of Reptiles, save in those of the Crocodilia.

Respiration in Reptiles is carried on solely by means of *lungs*, the presence of branchiae or gills always in early life, and sometimes in the adult life also of Amphibians, constituting a marked difference between these latter and Reptilian forms. In the Crocodilia, Chelonians, and most Lizards, the lungs are equally developed, but in Serpents and some Lizards only one lung is fully developed, the right lung being usually abortive. The lungs may, as in Snakes and other Reptilia, in which the body is elongated, be of proportionally large size, and may extend nearly throughout the whole length of the body, which is not separated by a complete diaphragm or *midriff* into a distinct thorax or chest and abdomen. The lungs are in general richly cellular, the bronchi or air tubes ending abruptly amid the lung-tissues. And (as in Crocodilia) the bronchi may give off lateral branches, which are in communication with dilatations or passages in the lung structures. From these passages air flows by rounded apertures into the air cells of the lung, in the capillary blood-vessels of which the blood is subjected to the aerating process. In the Crocodiles, Lizards, and Serpents the respiratory action is carried on through movements of the walls of the trunk. But in Chelonians, in which the body is consolidated to form the well known box like structure (seen in the Tortoise), and in which no movements can take place, air is drawn into the lungs by a process analogous to swallowing and to that by means of which the Amphibia (Frogs, &c.) also breathe. The larynx or organ of voice is simple in structure, no vocal cords being in general developed, although these organs appear in Crocodilia.

In the higher Reptilia the true brain or cerebrum attains a comparatively larger size than in the lower forms, whilst the cerebellum also attains a relatively higher development as we proceed upwards from the lower to the higher members of this class. The spinal cord is of uniform calibre in Ophidia. It presents two enlargements in Chelonians. The cerebellum has no lateral lobes or *pons*, whilst in the true brain the *corpora quadrigemina* and *thalami* are dis-

tinctly developed. The senses are present in tolerable perfection. The nasal cavities are of large size, and open posteriorly into the mouth. In the Crocodilia the hinder nostrils open very far back in the mouth (close under the basi-occipital), this arrangement enabling these animals to hold their prey under water in their mouths, and so to drown it, whilst their own respiration is carried on unimpeded through the nostrils. The eyes of Reptiles are usually of small size, and exhibit throughout the class variations in structure and in the disposition of the protective coverings. Thus in Snakes the sclerotic or outer coat of the eye is of fibro cartilaginous consistence, and the eye-ball in front is covered by a transparent lid, formed by a layer of the skin, which is attached to a circle of surrounding scales, and is named the *antocular membrane*. This membrane supplies the place of the eyelids, and hence the stony gaze of these animals, no process of winking taking place. Internally the antocular membrane is lined by a layer of the *conjunctiva* (see EYE), which is reflected forwards from the inner layer of that membrane covering the eye itself. And between these conjunctival layers, and in the cavity formed by them, the lachrymal secretion (or 'tears') is received, for the purpose of keeping the eye moist. The antocular membrane is shed or moulted periodically, with the outer or epidermal layer of the skin. In Snakes the pupil of the eye is of a round form. In the Lizards movable and ordinary eyelids exist, whilst the Chelonia, &c., possess the *nutating membrane* (which see), or third eyelid, also seen in both lower and higher Vertebrata. In Lizards and Snakes the sclerotic coat of the eye is strengthened by a circle of bony (sclerotic) plates, these structures also occurring in several extinct Reptilian forms and in Birds. In the Chameleons, among Lizards, the single eyelid is formed by the united lids, and through an opening in this circular lid the rays of light reach the pupil of the eye within. The tympanum of the ear is imperfectly developed in Ophidia, and no Eustachian tube exists. In Lizards the tympanic apparatus is better developed, whilst in Chelonians the tympanic cavity is large and complicated, and a rudimentary cochlea (see EAR) exists. The Crocodilia possess a movable valve, by means of which the tympanum of each ear can be closed at will, and in the latter forms most of the structures found in the ear of higher Vertebrata are represented in greater or less structural detail and perfection.

The *urinary system* of Reptiles is represented by kidneys, generally placed far back and deep within the pelvic cavity. In the Serpents, however, the kidneys are situated anteriorly, and are unsymmetrically placed, the right being placed higher up and in advance of the left kidney, whilst they are also divided into small movable lobes. In Crocodilia and Chelonia the kidneys are broader than in Ophidians, and in the former group they are of compact structure, their *ureters* or efferent ducts terminating in prominent papillae in the uro genital portion of the cloaca, already described. No urinary bladder exists, and the urine of the Lizards is said to be fluid, that of the Serpents, &c., resembling the secretion of Birds, in being solid or chalk like and crystalline in its nature. *Supra renal capsules* occur in most Reptiles.

The male generative organs consist of testes and a penis or copulatory organ. In Crocodilia the testes are elongated, and placed in front of the kidneys. The penis in Crocodilia is single, grooved, and contained within a special cloacal fold. In Ophidia two lateral penes exist, and these are hollow, eversible, and may be of bifid conformation. A double penis exists in Lizards, whilst that of Chelonia is single.

The female organs consist of *ovaria*, or ovaries (see OVARY), which in Crocodilia are compact, the oviducts being disposed each in three parts, the first of which possesses longitudinal rugae or folds, the second being glandular with transverse folds, and the third dilated and of shell forming function. A *clitoris* exists in the cloaca of Crocodilia and Chelonia. In Ophidia the ovaries are asymmetrical, the right being usually situated in advance of the left. In Chelonia each ovary consists of a stroma or net-work of fibrous tissue, the ova or eggs being developed from the free or ventral surface of the organ.

The ova are in general retained within the body of the parent until the development of the young has proceeded to a greater or less extent. And in some forms (for example, some Snakes and Lizards) the young actually escape from the eggs whilst the latter are still contained within the parent oviduct. In such cases the ovo viviparous form of reproduction (which see) is exemplified. The eggs are generally of relatively large size, and provided with a thick parchment like shell and a large yolk. In many instances (for example, Crocodilia and Turtles) the eggs may be deposited in sand, and be hatched by the sun's heat. An amnion and an allantois are formed during the development of the Reptilian embryo, the amnion first appearing in the present class, whilst the allantois is but feebly represented in Amphibia.

With regard to the distribution in space of Reptiles, the warm or tropical regions of the earth are those which contain these animals not only in greatest number, but in most typical form and variety also. During winter, or in the colder seasons of the year, most Reptiles hibernate, and the Snakes are notable as periodically moulting their skin or epidermis.

The *special secretions* of Reptiles are noted more appropriately in the articles descriptive of the various prominent genera or species of these animals. Thus the poison apparatus of Serpents will be found noticed under the head of SERPENTS, and in Lizards certain glands are found developed in the skin surrounding the anus, and in that of the thighs and inguinal regions. These glands are termed *crural glands*, and open externally by pores. Their functions, however, are undetermined.

The classification of this group of Vertebrates has been already noticed. The first order, that of the Chelonia, is distinguished by the peculiar modification of the skeleton to form a bony box, in which the body is more or less completely inclosed. The Tortoises and Turtles (which see) are included in this order. The characteristics of the Ophidia are described in the article on SERPENTS (which see). The Lacertilia are noted under the head of LIZARD, and the Crocodilia under that of CROCODILE (which see). Various prominent members of these several orders (such as Alligator, Chameleon, Rattlesnake, &c.) will also be found duly described in articles specially devoted to these forms, and some typical forms are figured in the plates.

The extinct orders also receive notice under their several or allied headings. Thus, the PLESIOSAURI, ICHTHYOSAURI, PTEROSAURIA, PTERODACTYLES, &c., are described in these articles respectively.

The Amphibia, as already mentioned, are more properly excluded from this class and included in the province Ichthyopsida, along with the Pisces or Fishes. The Amphibia are distinguished firstly by the fact that they all possess gills in early life and lungs in adult life. In some forms (such as the Proteus, Siren, &c., see plate, BATRACHIA) the gills of early life persist throughout the entire existence, the animal thus breathing partly by gills, and partly by lungs, whilst in other Amphibia (for example,

Frogs and Newts, also figured) the gills disappear when the lungs are developed. The heart and circulation are similar to those of Reptiles, the heart being three chambered in all Amphibia. The blood is cold. The skin is usually devoid of scales or other form of exoskeleton. The skull is joined to the spine by *two* condyles, instead of by one only, as in Reptilia. No amnion is developed in the development of Amphibia, but a rudimentary allantois appears. In their reproduction these forms are oviparous, a few being ovo viviparous. The nostrils communicate posteriorly with the mouth, and the rectum, ureters, and generative organs open into a common chamber or cloaca as in Reptiles. Lastly, a feature most characteristic of the Amphibia lies in the fact that they undergo a *metamorphosis* in the course of their development, whilst passing from the embryonic to the mature state—the phases of such metamorphosis being familiarly exemplified in the series of changes through which the tadpole or embryo frog becomes metamorphosed into the adult form of that animal. This class is divided into four orders. The first order, that of the Ophiomorphi, includes those serpentine forms known as Cæciliæ or Blind worms (see fig 1 of plate BATRACHIANS), found in tropical climates. The second order, or Urodela, is represented by those Amphibia which possess persistent tails such as the Newts, Proteus, Salamanders, &c (fig 10 19). The Anouia forming the third order include the Frogs and Toads (fig 2 9) or 'Tailless' Amphibians, whilst the last order, that of the Labyrinthodontia, is devoted to the reception of extinct Amphibia, of which the Labyrinthodonts (which see) are the most familiar examples. The several genera of Amphibia are more fully dealt with under their respective headings such as FROG, TOAD, NEWT, &c.

REPUBLIC Taken in the widest sense the term republic designates a state or political constitution in which the supreme power is vested not in an hereditary ruler, but in an elective and representative assembly. This form of government may vary according to the basis of election, the body of electors, and the class eligible from the proudest aristocracy to the most absolute democracy. Poland was formerly called a republic because the king was elected by the nobles, and in the eighteenth century it was not uncommon to designate the German Empire by the appellation of the republic of princes. The large commercial cities of Italy, Genoa, and Venice were called republics because they were governed by an aristocracy of noble families, who appointed one of their number to be supreme chief of the state, as the *doge*. The republican institutions of the greater part of the Greek states, as well as that of Rome, at least in later times, were of a more democratic character. The first republic of any great extent in Modern Europe was the confederation of the seven provinces, constituting the Dutch Republic after their separation from Spain, and which continued until the year 1815, when it became an hereditary monarchy. Next comes Switzerland which became a republic after having freed itself from German rule. Great Britain was nominally a republic for eleven years, from 1649 to 1660, as also was France from 1793 to 1804. France again assumed a republican constitution in 1848, which, however, only lasted till 1852. But on the 4th of September, 1870, a republic was established in France for the third time in its history, and it is likely to continue to exist. The republics created in Hungary, Italy, Baden, and Rhenish Bavaria after the revolutionary movements of 1848 were all very ephemeral. Spain possessed a republican government twice in the course of somewhat recent years—in 1868–69 and

in 1873–74. Besides the quasi republican cities of Germany—Bremen, Hamburg, and Lübeck—and the diminutive republics of San Marino, in Italy, and Andorra, the only republics in Europe at the present day are those of Switzerland and France. In the New World, on the other hand, the republican form of government prevails universally among the independent states, the most important of all the republics there being, of course, the United States. The United States, like Switzerland, is a federative republic, consisting of a number of separate states bound together by treaty, and having a central government, with power to enact laws binding on all the citizens, and it furnishes us with an example of the working of the pure democratic principle on a scale never before approached. Mexico has been a republic since 1824, except during the short lived empire from 1863 to 1867. Brazil has been a republic only since 1889. The island of Cuba was constituted an independent republic under United States suzerainty in 1902.

REPUTED OWNERSHIP, in law, is a phrase used of one who has to all appearances the right and actual possession of property. The false credit raised by a person exercising all the rights of ownership over a subject not his own has led to the adoption of the rule that the creditors of the reputed owner may take the subject as if it were his own. In England this rule is enacted by statute, in Scotland it is supposed to exist at common law. By the English Bankruptcy Act of 1883, which in this respect merely re-enacts a provision contained in earlier acts, it is provided that all goods and chattels being at the commencement of the bankruptcy in the possession, order, or disposition of the bankrupt, in connection with his trade or business, by consent and permission of the true owner, of which goods and chattels the bankrupt is the reputed owner, or of which he has taken upon himself the sale or disposition as owner pass to his trustee, provided that things in action, other than debts due to him in the course of his trade or business, shall not be deemed goods and chattels within the meaning of this clause.

REQUESTS, COURT OF, an ancient court of equity in England presided over by the lord privy seal. It was inferior to the Court of Chancery, and was abolished in the reign of Charles I. The name was also given to tribunals of a special jurisdiction for the recovery of small debts, which were abolished in 1816 and 1847.

REQUIEM ('rest'), in the Roman Catholic Church, a solemn musical mass for the deceased, which begins 'Requiem æternam dona eis' ('give them eternal rest'), &c. (See EXFUNKES.) The most distinguished musicians have employed their talents on the requiem, as Mozart, Cherubini, Brahms, Verdi, Berlioz, and many others.

REDOS, in ecclesiastical architecture, an ornamental screen or structure at the back of and rising above an altar, generally adorned with niches, statues, &c., or with paintings or tapestry, or the term may be applied to apply to the more or less ornamental wall at the back of an altar. In many English churches and cathedrals redoses have been erected in recent times, but they were a common feature of old churches, in which fine specimens may still be seen. They often extended across the whole east end of the church, and might be carried up to the ceiling, being 'enriched with a mass of most intricate and beautiful tabernacle work, with crockets, buttresses, niches, statues, pinnacles and other ornaments.'

RESCRIPT (Latin, *rescriptus*, written back), the term applied in Roman law to the answers of popes

and emperors to questions in jurisprudence proffered to them officially. The rescripts of the Roman emperors constitute one of the authoritative sources of the civil law. These were usually addressed to the provincial magistrates, to corporations, or even to individuals. The rescripts of Justinian admitted into the code have acquired great authority. The rescripts of the popes concern principally theological matters.

RESERVATION, MENTAL, consists in this, that a person making a statement, by holding back some word or clause gives a signification or interpretation in his own mind to the words of the statement different from the meaning which he to whom the statement is made will naturally attach to them, with the purpose of deceiving or misleading. It is always an intentional violation of the truth and of course of the strict rules of morality. It would be a case of mental reservation if a person on being asked if he had seen Mr. So and so should reply 'I have not seen him', mentally reserving the words 'at his house', having actually seen him elsewhere. Here the words uttered aloud could only bear one meaning, and that a direct violation of the truth. Mental reservation thus differs from equivocation, which cannot be called a direct violation of truth, for the essential character of an equivocal expression is that it can be interpreted in two ways though the way in which it is most likely to be interpreted is the least consistent with the truth. For example a servant might reply to the inquiry whether his master were at home by saying 'He is not here', which might either mean that he was not in the house, or that he was not in that particular spot where they were standing though the former sense which was not the true one would be that which the visitor would be most likely to attach to it. The lawfulness of mental reservation and equivocation has been the subject of much keen controversy amongst casuists, the Jesuits in particular maintaining that it was not only lawful but commendable in certain cases. Pascal in his famous *Letters to a Provincial* makes this tenet of theirs a mark for his keen shafts of satire, and he cites numerous instances in which they are exposed as upholding this method of violating truth. Casuists divide cases of mental reservation into two classes—*purely mental* of which an instance has already been given, and *not purely mental* of which many examples are to be found in places such as the *not at home* of polite society, where the misstatement hardly deceives any one. Roman Catholic casuists do not as a body defend purely mental reservation, justly regarding it as a direct violation of the truth, but on the other hand they hold that reservation not purely mental as in certain cases justifiable and not inconsistent with truth and allegorical precedent for their view. The principles on which a resort to it and to equivocation is defended are (1) that there is supposed to be in the circumstances justification and even necessity for not making known the whole truth (as for instance when an intending murderer asked a person where he could find his victim) and (2) that the mental reservation in the case supposed does not amount to more than a mere *withholding the entire truth* inasmuch as what is stated is absolutely true, and the real meaning of the speaker is absolutely contained in it and discoverable from it, and the false construction put upon it by the hearer although permitted through necessity or grave reason by the speaker is not *positively* put forward by him. Addis and Arnold's Catholic Dictionary gives as a case of lawful mental reservation that of a priest denying knowledge of a crime of which he has learned only through sacramental confession,

or that of a guilty person denying his crime when interrogated by one who has no authority.

RESERVE in military matters, has several significations. In battle the reserve consists of those troops not in action, and destined to supply fresh forces as they are needed, to support those points which are shaken, and to be ready to act at decisive moments. The composition and disposition of the reserve is of the utmost importance. It ought to be composed of the best and most experienced troops, not exposed, yet placed so that they can operate easily on all sides and ought to be commanded by an experienced, cool, but resolute general. Napoleon's guards, and his disposition of them, are models. They often decided the victory when the enemy felt sure of success. The reserve of ammunition is the supply of warlike stores placed close to the scene of action to allow of the supply actually in the field being speedily replenished.

The term reserves is also applied to those forces which are liable to be called into the field on great emergencies for the purposes of national defence, which have received a military training but follow the ordinary occupations of civil life and do not form part of the standing army. Such reserves now form a part of all national troops organized on a great scale. In Great Britain the reserves consist of the army reserve, the militia reserve and the auxiliary forces, namely the militia, the yeomanry and the volunteers. The army reserve consists of two classes of men. The first class comprises short service men, who, having served not less than three years in the active army, are placed on the reserve to complete the remainder of their period of enlistment, and of men who have served the whole period in the active army, but being young enough voluntarily enroll themselves in the reserve. The second class is made up of enrolled pensioners, who are liable only to home service, but this class is dying out. The first class of the reserves receive 4*d* a day, besides 4*l* a year and 2*s* a day during their annual period of training, which extends to not more than twelve days. According to the army estimates for 1901-02 the strength of the various reserve forces was as follows: army reserve (first class) 90,000; militia 131,539; militia reserve recently reorganized 50,000; militia of Channel Isles, Malta and Bermuda 6,002; yeomanry 55,000; volunteers 37,000; total 687,541.

RESERVED LIST in the British navy, comprises those old and meritorious officers retired from active service who are yet liable in the event of the active list being exhausted to be called upon for further service as a contingency however not likely to happen. When placed upon the reserved list they are promoted to the grade next above that which they held previously, but afterwards receive no further promotion. They receive the half pay of the rank to which they are promoted, and their removal leaves room for the promotion of younger and more active officers, which is the principal object for which the reserved list was called into existence.

RESERVOIR a receptacle for storing water for any purpose, but more commonly for supplying towns, feeding canals, driving machinery, and the like. The construction of a reservoir is of much importance and requires great engineering skill. In the selection of a site the great object should be to choose a position which will give the means for collecting a large supply of rainfall with as little recourse as possible to artificial constructions. An advantageous site would be, for instance, in the narrow gorge of a valley through which a stream passes, and at a place where the gorge widens out on the side looking towards the source of the stream.

Particular care, however, is necessary to discover whether the position chosen communicates with the courses of underground waters or springs, as disastrous results have frequently been occasioned by ignoring this. As a general rule the best and safest method is to establish reservoirs in valleys filled in with clays derived from the decomposition of the primary formations, which are very slightly permeable. The embankments or dams may be constructed either of masonry or earth work the latter being generally the more economical method. Where the reservoir requires to be constructed on perfectly level ground the excavation should be calculated so as to equal the embankment. The earth work of dams should be as much as possible of material—such as a mixture of clay and gravel—which would resist the infiltration of the water, but as it is impossible always to obtain such material in sufficient quantities, engineers have recourse to a device which consists in the construction of a kind of wall termed a *puddle wall* formed in the middle of the embankment. This wall is constructed of well worked clay, the foundation of the puddle being a trench dug down to impervious rock or clay, and its breadth should be on an average about one third the height of the embankment. The inside slope of the embankment is usually 1 perpendicular to 3 horizontal sometimes it is steeper, the outside slope is 1 perpendicular to 2 horizontal, and the height above the surface of the water is 4 to 7 feet. The earth work ought to be constructed of thin layers carefully rammed so as to secure their equal settlement, the inner face requires to be protected by stones in order to resist the action of the water. The waste weir to admit of the surplus water flowing over should be from 4 to 6 feet below the surface line of the embankment built of strong mason work and of a width such that with a flow of 2 feet over the crown it should be able to discharge all the water brought down by the severest floods ever known to fall upon the basin supplying the reservoir. Many of the accidents that have occurred were due to deficiencies in the waste weirs. In the reservoirs of which the dams are built of masonry there is no necessity for a waste weir as then the water may be allowed to overflow the wall, there being no fear of its endangering the work. The outlet at the bottom, by which the water to be used is drawn off from the reservoir may consist either of a tunnel culvert, or iron pipes provided with suitable sluices and these should be so constructed that access may be had to them even when the reservoir is full.

The true principles for the proportioning of masonry dams were not thoroughly investigated until about the middle of the nineteenth century and subsequently. This was first done by French engineers, and many such dams have since been constructed in France, Algeria, the United States &c. The highest of all such dams is that of the New Croton reservoir, New York, its height being 248 feet, thickness at bottom, 185 feet, at top 16. The first great masonry dam built in France on the newer principle was that of Furens (1860-65), height, 184 feet, thickness at bottom, 162, at top 11. The San Mateo reservoir dam, San Francisco, is 170 feet high thickness at bottom 176, at top, 20. The Puriyar dam, India (1890-95), has a height of 173 feet, bottom thickness, 139, top, 12. In the famous reservoir of Alicante Spain, executed 1579-94, the wall is 67 feet thick at the top, 112 feet at the bottom and the height 141 feet. In England the preference is generally given to earthen dams. Sometimes natural lakes are used as reservoirs, in instances of which are Loch Katrine, for the water supply of Glasgow, and Lake Thirlmere, in Cumber-

land, for the supply of water to Manchester. Distributing reservoirs for towns are generally built of masonry, but are sometimes of iron. They ought to be placed high enough to command the highest part of the town and ought to be capacious enough to contain half a day's supply their chief use being to store the surplus water during the night. Among notable modern storage reservoirs for towns are those of the Vyrnwy for supplying Liverpool, containing 11 900 million gallons. Vchar (10 800 million gallons), for Bombay. San Mateo (31,000 million gallons), for San Francisco, and the New Croton (32,000 million gallons) for New York.

RESINA, a town of Persia capital of the province of Ghilan, 150 miles north west of Ichem near the Caspian Sea, on which is its port Enzeli. The houses here are of a very superior construction and the streets generally well paved, but the whole town is so enveloped by trees that no idea of its full extent can be formed from its appearance taken in any one point of view. The bazars are extensive, regular, clean paved, and well kept. Beggars are more numerous and importunate here than in any other town in Persia. The present town is comparatively modern. The trade in silk is of very great importance, and silk goods are manufactured in the town. Pop. estimated at 40 000.

RESIDUARY LEGATEE the person to whom the surplus of the personal estate after the discharge of all debts and particular legacies, is left by the testator's will.

RESINA a town of Italy, 6 miles s.w. of Naples, on the Gulf of Naples. It stands about 70 feet above the site of the ancient Herculaneum, and there are numerous fine villas in its environs. Valuable wines are made in the vicinity. Pop. 16,000.

RESINS a class of vegetable substances insoluble in water soluble in alcohol ether benzene, and most volatile oils and easily softened or melted by heat. Resins are either neutral or acid, they are transparent or translucent they have generally a yellow brown colour, are sometimes elastic, but more generally friable and hard. They become electric when rubbed are non volatile and form soaps with caustic soda. They are used in the manufacture of varnishes soaps and sealing wax, for sizing paper and cloth, and also in medicine. Resins may be divided into three classes—

(1) Those which exude spontaneously from plants, or from incisions in the stems and branches. They are generally mixtures of gum resins and volatile oils, being then known as *oleo resins*. The principal resins belonging to this class are benzoin, dragon's blood, Peru balsam, storax, asafetida, copaiba, copal, dammar, kauri, elemi, gamboge, guaiacum, jalap, lac, myrrh, mastic, sandarach, scammony, and turpentine.

(2) Resins extracted from plants by alcohols, they generally contain definite carbon compounds. The principal resins belonging to this class are gum ammoniacum, angelica root, Indian hemp, cubeba, manna, and squill.

(3) Fossil resins, occurring in coal or lignite beds. They contain oxygen. The following are the most important—amber, asphalt, copalinite, fossil caoutchouc, ozokerite &c. Some members of the first two classes are *gum resins* (which see).

RESISTANCE, *ELECTRIC*, the opposition which a conductor offers to the flow of electricity. This definition requires to be slightly modified if we consider resistance in its strictly technical sense. When a current begins to flow in a wire it induces currents which oppose its progress, both in the wire itself and in neighbouring conductors. A current also heats

a wire, and the opposition from induced currents and from the heating of the wire is not included in the term the resistance of the wire. When the electricity has flowed from end to end the inducing action in the wire itself is supposed to have ceased, the wire may be removed so far from neighbouring conductors that their action will be very small, and it can be maintained at the temperature of 0°C . Under these conditions the opposition of the wire to the passage of electricity is called its resistance.

Suppose a pipe to be such that, if water be forced through it by a pressure of 1 lb., the quantity passed will be 1 quart per minute, and that by increasing the pressure to 2 lbs. the quantity becomes 2 quarts per minute, and so on, the resistance of such a pipe to the flow of water through it is similar to the resistance of a conductor to the flow of electricity. The resistance of the pipe may be expressed as the ratio of the pressure to the quantity of water passed, it is a quality of the pipe, and is independent of either the quantity or the pressure. *The resistance of a conductor of electricity is the ratio of the electromotive force to the current, and it may be stated thus*

$$R = \frac{E}{C} \quad (\text{See OHM'S LAW})$$

The unit of resistance adopted by the British Association is called an Ohm, it is about equal to the resistance of a round copper wire 485 metres long and 1 millimetre in diameter. A copper wire twice as long has a resistance of 2 Ohms, and a copper wire whose diameter is twice as great, but of the same length as the standard wire, has a resistance of $\frac{1}{4}$ Ohm. Resistance is proportional to the length of the conductor, and inversely proportional to its sectional area. Resistance is independent of the shape of the cross section of the wire, and in good conductors it is increased by an elevation of temperature. When a circuit is composed of a number of parts, the total resistance is the sum of the resistance of the parts.

We may talk of the resistance of the battery and the external resistance. The liquids of the several elements of the battery may be considered as so many short wires of liquid, having a length equal to the distance between the plates and a sectional area determined by the areas of the plates, and the resistance in the battery is the sum of the resistances in all the elements. The absolute unit of resistance is the resistance of a conductor which allows one unit of electricity to pass per second when the electromotive force is unity. The Ohm, mentioned above, is equal to 1,000,000,000 C.G.S. units, in which the centimetre, gramme, and second are chosen as the units of length, weight, and time. The specific resistance of a substance referred to unit volume is the resistance of a unit cube of the substance to the passage of electricity between two opposite faces.

In dealing with the resistances of liquids and gases it appears that there is an important opposition to the flow of electricity at the film of contact between the metal connector from the battery and the liquid or gas, in addition to the real resistance of the medium. This is called *polarization*, and should not be confounded with true resistance. A somewhat similar opposition is met with in solid conductors having very great resistance, such as gutta serena. On taking a current through the gutta serena covering of a long wire it was found to decrease from second to second, till at length a constant quantity was transmitted, on removing the battery a current flowed in the opposite direction, which became weaker and weaker at the same ratio as that at which the first current had weakened. The gutta serena appears to act as a store for the electricity. Recent experiments on the conductivity of glass at different temperatures show that the same thing occurs in glass,

and what has long been known as the residual charge of a Leyden-jar is a similar phenomenon.

Conductivity is the reciprocal of resistance. It is found that the relative conductivities of the metals for electricity are nearly their relative conductivities for heat. For measurements of electrical resistance see **RHEOSTAT**.

RESOLUTION AND COMPOSITION OF FORCES When a number of forces act at a point, the effect of all the forces may be produced by a single force, this single force is called the resultant force, and is said to be composed of the actual forces. On the other hand, a force acting at a point may be replaced by a number of forces, and these forces are called resolved parts of the original force. When a tug boat tows a number of ships at one time the force straining each hawser is equal and opposite to the resolved part in the direction of that hawser of the total force exerted by the tug boat. When a horse drags a canal boat the towing rope is inclined to the direction of motion of the boat, the force giving motion to the boat is the resultant of the force in the rope, and of the forces exerted by the water against the helm and sides of the boat. The subject of the resolution and composition of forces will be found sufficiently treated under **MECHANICS**.

RESONANCE, a strengthening of sound. When a person speaks in an empty room the walls reflect the words. There is an echo from each wall, and when the person is not equidistant from the different reflecting surfaces the echoes strengthen one another, and strengthen the sound. Suppose we have only to deal with one reflecting surface, at a distance of 112.5 feet from the speaker, there will be an interval of one fifth of a second between the word and its echo, and the speaker will be able to distinguish the sound from its reflection, for any shorter distance the echo will merely strengthen the sound. Resonance includes such strengthening of sound as occurs when a sounding board is used to strengthen the note from a string or the note of a tuning fork, or when the air contained in an open mouthed vessel is made to vibrate and strengthen a particular note.

RESPIRATION, a function in living beings partly nutritive, partly excretory, whose purpose is to maintain the normal character of the blood as regards its gaseous constituents. In animals the function of respiration or breathing is devoted chiefly to the removal from the blood, through the media of the breathing organs, of carbonic acid, and at the same time to the introduction within the blood of fresh supplies of oxygen. Other products besides carbonic acid, as will be presently noted, are undoubtedly given off in the process of animal respiration, and these products form points for consideration when the function is regarded in the light of one of the chief excretory processes of the living form. Primarily, then, the respiratory function in animals may be considered to be devoted to the excretion of carbonic acid, and to the absorption or inhalation of oxygen gas. But respiration, or an analogous process, also occurs in plants: the leaves of vegetables representing the breathing organs of animals. In its most obvious details we find the process of vegetable respiration to present an exactly opposite aspect to that process in animals, the leaves of plants thus inhaling carbonic acid, the carbon of which they fix, while they liberate the oxygen. The carbon is made use of by the plant for the building up of some of its products, gums, sugars &c. This is, therefore, strictly an assimilative process. Careful investigation shows, however, that the plant also performs a true respiratory process, by which carbonic acid gas is exhaled and oxygen absorbed. The process by which carbon is fixed is performed only by the green parts of plants

and is carried on in the sunlight, while the true respiratory process of plants can be performed without the aid of light.

In animals the various forms of breathing apparatus are all devoted to the characteristic excretion of carbonic acid and the absorption of oxygen. And all forms of respiratory organs may be considered to be simply structures, which in their essential functional features present us with minute net-works of blood vessels, so arranged that their contained blood may be duly exposed to the influence of oxygen gas, whilst carbonic acid gas is excreted. In the Protozoa (which see) no respiratory organs are specialized, but the protoplasm of which the bodies of these animals are composed has doubtless the power of excreting waste matters, as well as of absorbing nutritive material. In Coelenterates (which see) respiration may be performed in the absence of distinct breathing organs by means of the ciliated surfaces of the body, or through the media of ciliated tentacles, and in either case we find the renewal of the nutritive fluids associated with their active circulation by means of the vibratile *cilia*, which, even in the highest organisms, are connected with the respiratory process. In Echinozoa or Annulida respiration may be subserved (as in Echini, or Sea-urchins, &c.) by the *mesentery*—the internal ciliated membrane supporting the viscera, whilst in such forms as Holothurians, or Sea cucumbers, a special set of tentacles appear to form the breathing apparatus, along with a set of internal tubes, to which water is admitted, and which constitutes the so called 'respiratory tree'. Amongst the Annulosa, Mollusca, and Vertebrata the breathing organs may be represented by air tubes or tracheae (Insects, &c.), pulmonary sacs (Spiders, &c.), branchial sacs (Sea squirts), ciliated tentacles (Polyzoa, which see), lungs (Reptiles, Birds, and Mammals), lungs and gills combined (Amphibia), or gills alone, of varying degrees of structural form and complexity—as in Marine Annelida or Worms, in Crustacea, in most Molluscs, and in Fishes. It is also to be noted that even in comparatively high organisms, where no specialized breathing organs are developed, the function of respiration may be carried on by the skin or general body surface—the integument being, as in the highest forms, and as will be duly noticed, intimately correlated in its functions to the breathing process. Thus in Earthworms, Lower Crustacea, &c., the breathing appears to be solely subserved by the body surface.

The typical structure of the LUNGS has been described in the article of that name, and the essential difference between respiration in air and respiration in water consists in the modification of the breathing organs in the latter case to form surfaces adapted for absorbing the oxygen contained or suspended in the aquatic medium. The gills of aquatic forms, therefore, simply present us with surfaces exposed to a continuous flow of water, maintained by various expedites. As in the little fish known as the lancelet (which see) this flow of water may be maintained by the action of vibratile cilia, or, as in ordinary fishes, a continuous flow of water may be received by the mouth, may pass into the gill chamber and flow over the gills, and be finally ejected by the gill opening situated behind the operculum or gill cover. Each gill consists essentially of a number of delicate vascular filaments, supported on a structure known as the branchial arch. Each filament in turn contains an afferent (venous) and efferent (arterial) blood-vessel, these two vessels being united by a delicate capillary net-work, in which the blood is exposed to the action of oxygen. The air in water, it is finally to be noted, is not *chemically* combined with the water, but merely dissolved in it according to ordinary physical laws.

In the higher animals breathing air directly from

the atmosphere, inhalation and exhalation, is carried on in various ways. As in man, birds, &c., the movements of the thorax or chest within which the lungs are inclosed serve for the renewal of air in the breathing organs. The chest is thus enlarged for *inspiration*, or the drawing in of air, by a purely voluntary and muscular act, the external intercostal muscles, the *diaphragm* or midriff, and the internal intercostals in part, together with other muscles, producing this effect. The vertical diameter of the chest is increased by the descent and contraction of the diaphragm, whilst the antero-posterior diameter of the thorax is increased by the contraction of the intercostal muscles, the sternum or breast bone being at the same time pushed forward. In ordinary tranquil *expiration* the chest and lungs return to their previous and unexpanded state, chiefly in virtue of their elasticity. The recoil of the costal or rib cartilages, added to the elasticity and recoil of the lungs themselves, appear amply sufficient to expel the air in expiration, without the assistance of any muscular effort. But in forced expiration, as in singing, coughing, &c., the muscles of expiration are brought into play, these being the muscles of the abdominal walls, which, by pressing on the abdominal organs, push up the midriff, and thus by pressing on the lungs cause the forcible expiration of their contained air. The muscles depressing the ribs also act in forced expiration—the internal intercostals in greater part, the triangularis sterni and other muscles thus aiding those of the abdomen. The acts of inspiration and expiration in ordinary circumstances occupy a nearly equal period. In women and children expiration takes a little longer than the inspiratory effort, and a short pause, in both sexes, succeeds expiration before the next inspiratory effort. The rhythm of the respiratory movements has been attempted to be expressed by assuming *inspiration* to be represented by six, *expiration* by seven or eight, and a *short pause* to elapse after expiration.

A difference between the mode of breathing in the two sexes is clearly perceptible. Thus in men the breathing is chiefly abdominal in its character, that is to say, the lower part of the chest and sternum, together with the abdominal muscles, participate before the upper portions of the chest in the respiratory movements, whilst in women the breathing movements are chiefly referable to the upper portions of the chest, this latter mode of respiration being termed *pectoral* or *superior costal*, in contradistinction to the *abdominal* or *inferior costal* movements of man.

In those lung breathing animals in which the walls of the chest are either rigidly fixed (as in Tortoises and Turtles), and incapable of movements, or where a bony framework is wanting in the thorax (as in Frogs), air is taken into the lungs by a process analogous in its nature to swallowing. Thus the frog in breathing first closes its mouth, and then draws a full supply of air into the oral cavity through the nostrils. The hinder nostrils are next closed, and by the contractions of the muscles of the pharynx and cheeks the air in the mouth is driven into the trachea or windpipe, and thence to the lungs.

The quantity of air received into the lungs of man has formed a subject of physiological investigation. At each inspiration made by a healthy adult man about 30 cubic inches are calculated to be inhaled, and at every expiration nearly the same, or at most a slightly smaller volume of air is exhaled—an allowance having necessarily to be made for the increased temperature of the expired air. Bourguery says that old people in health breathe more deeply than the young, and change at each respiration a greater quantity of air than the latter. Thus in twenty four hours Dr E. Smith says an adult at rest will pass about 686,000 cubic inches through his lungs, this amount

being largely increased by exertion. A labourer hard at work in the same period may pass in and out of his lungs about 1,568,390 cubic inches.

The quantity of air which passes in and out (20 to 30 cubic inches), or is duly exchanged in each act of ordinary breathing, is named *tidal* or *breathing* air. The quantity (about 100 cubic inches) which may be taken in in a deep inspiration, in addition to the tidal air, is termed *complemental* air. The quantity of air (75 to 100 cubic inches) remaining in the chest after an ordinary expiration has expelled its tidal air, is named *supplemental* or *reserve* air, and this may be in greater part expelled by a deeper expiration, whilst a quantity of air, also averaging from 75 to 100 cubic inches, always remains in the lungs after the deepest possible expiratory effort, and cannot be got rid of. This latter quantity is therefore appropriately named *residual* air.

The vital capacity of the human chest, or the perfect standard by which the due performance of the function of respiration may be measured, varies with the *height*, *weight*, and *age* of the individual. A healthy person, 5 feet 7 inches in height, and at a temperature of 60° Fahr., should be capable of expelling from his lungs, after the deepest inspiration he can make, about 225 cubic inches of air. And for every inch above this height the capacity as regards air expired, should increase about 8 cubic inches, and should diminish in the same amount for every inch below that height. The capacity for respiration is not affected by *weights* under 161 lbs. In weights above that amount the capacity is diminished at the rate of 1 cubic inch for every additional lb up to a weight of 196 lbs. Thus a man of 5 feet 6 inches, weighing under 11½ stones, should be able to expire 217 cubic inches, and one of the same stature, but weighing 12½ stones, might expire 203 cubic inches only. The *number* of respirations in a healthy adult averages from fourteen to eighteen per minute, but the number varies greatly according to age, exercise, disease, and other modifying circumstances—respiration being more active in the young and aged than in the middle period of life.

The blood is conveyed to the breathing organs by special vessels, the right side of the heart in Birds and Mammals being exclusively employed in driving blood to the lungs for purification. The blood is sent from the left ventricle through the pulmonary or lung capillaries in a steady stream, and passes through these minute vessels at a rate sufficient to expose it to the action of the oxygen contained in the air cells of the lung (See LUNG). The essential part of the function of respiration, namely, the interchange of oxygen for carbonic acid gas, thus takes place in the lung, and the circulation through the pulmonary capillaries appears to be unaffected by atmospheric pressure, and is also certainly free from muscular pressure also. The pulmonary veins are destitute of valves.

The changes to the gases concerned in respiration may next be noticed, with a view to the determination of the part played by these gases, and by the atmosphere generally, in the respiration of animals. Both air and blood undergo changes in the lungs during respiration, and in the enumeration of these changes the essentials of the process are concerned. Ordinary pure atmospheric air consists (apart from accidental gaseous or other constituents) of about 79 volumes of nitrogen to 21 volumes of oxygen gas in 100 volumes. The accidental or unnecessary constituents are carbonic acid (present in the proportion of 4 or 5 volumes in 10,000 of air), and traces of ammonia, sulphuretted hydrogen, with particles of organic and inorganic matter mechanically suspended in it. The quantity of watery vapour in the atmo-

sphere of Britain averages about 1.40 per cent, but may be greatly exceeded or decreased in other countries and climates. By the presence of an animal—that is, through the performance of respiration—the atmosphere is firstly rendered *warmer*. Expired air has a temperature of between 90° and 100°, nearly that of the blood, whilst inspired air is that of the ordinary atmosphere. Secondly, the atmosphere has *watery vapour* added to it, in a quantity generally sufficient to saturate it. Thirdly, *carbonic acid* is added to the atmosphere. Inspired air has the composition of ordinary atmospheric air. Expired air gains about 5 per cent of carbonic acid, and loses about an equal amount of oxygen. Some authorities state that every volume of inspired air loses 4½ per cent of oxygen and gains rather less carbonic acid. An average healthy adult man will excrete in this way about 6.36 grains, or 1.116 cubic inches of carbonic acid per hour, the weight in actual carbon being about 173 grains per hour, or more than 8 oz in twenty-four hours. It is to be remarked that the quantity of carbonic acid given off varies under different circumstances. Males excrete more than females of the same age. The quantity exhaled increases in males from eight to thirty years of age (Andral and Gavarret), from thirty to forty years it is stationary, from forty to fifty it diminishes, and in old age it hardly exceeds the quantity given off at ten years of age. In females a similar increase is seen from eight years of age till puberty, and during the reproductive period of woman's life the quantity of carbonic acid exhaled remains stationary, whilst after the cessation of menstruation it decreases as in the similar ages of men. Carbonic acid also varies in quantity according to the frequency of the respirations, and the higher the temperature of inspired air—up to 104° Fahr at least—the less is the carbonic acid exhaled into it (Fetclier). In spring more carbonic acid is exhaled than in the other seasons, respiration being then more active, whilst in autumn the least amount is given off. Accordingly as the inspired air is free from or impregnated with carbonic acid, so will the quantity of that gas which is exhaled be increased or diminished respectively. Where air containing carbonic acid is rebreathed the quantity exhaled is therefore less than where pure air has been inspired. Where pure air was inhaled 32 cubic inches of carbonic acid were given off per minute, but where the same air was repeatedly inhaled the quantity of carbonic acid exhaled decreased to 9.5 cubic inches (Allen and Pepys). The necessity for repeated currents and supplies of fresh air in meeting places and halls is thus demonstrated. Even if rebreathed air becomes incapable of sustaining life, it will not contain more than 10 per cent of carbonic acid. When the atmosphere is humid more carbonic acid is exhaled than in dry weather, and less is given off at night and during sleep than during the more active periods of the day. After eating the quantity is increased, and the use of pure alcohol and of rum, ale, and sherry seems to increase the amount of carbonic acid given off, whilst brandy, gin, whisky, but especially gin, appear to decrease the quantity exhaled.

Fourthly, the quantity of *oxygen* contained in the atmosphere is decreased, as has already been remarked, by the occurrence of animal respiration. The quantity of oxygen that disappears is slightly greater than that of carbon gained by the atmosphere. Small animals consume a proportionally greater amount of oxygen than large ones, and the quantity consumed is diminished by fasting, whilst animals do not appear to consume more oxygen than under ordinary circumstances, if the atmosphere have this gas added to it in excess. The nitrogen of the air is believed to be

a passive gas, so far as respiration is concerned, its chief function being apparently that of diluting the oxygen to the extent safe and sufficient for the respiration of animals—just as alcohol might be similarly made milder by dilution with water. If any change results to the volume of nitrogen present in the air, it appears in the fact that the nitrogen given off from the lungs is sometimes slightly in excess of that inspired. During fasting a small quantity of nitrogen may be actually absorbed but in no case does this gas of itself play any important chemical part in the respiratory function.

Fifthly, and lastly, a small amount of ammonia and of decomposable organic matter is added to the air during respiration. Ammonia, wherever so present, always appears in exceedingly minute quantities, whilst its source has been alleged to be decomposing particles of food left in the mouth, or even decayed or carious teeth. The organic matter given off from the lungs of an adult amounts to about 3 grains in twenty-four hours (Ransome).

Such being the changes induced in the atmosphere by the respiration of animals we may next consider the changes produced in the blood by the performance of this process, this latter query bringing us face to face with the actual and essential part of the whole function.

The blood having performed its nutritive round of duty, and having been, through the arterial and capillary system of vessels sent to the most delicate parts and intimate tissues of the body, passed onwards to the veins which arise from the capillaries, and is by these latter vessels returned to the right side of the heart and is thence sent to the lungs for purification. The blood, as conveyed in its backward or respiratory journey by the veins, is therefore much changed in character from that which was sent out as pure and arterial from the left side of the heart. The pure or arterial blood was thus of red or scarlet colour, presumably owing to the hemoglobin or colouring matter of the blood having been fully oxidized or oxygenated. Besides this difference in colour there are also variations in general composition to be perceived between arterial and venous blood. Arterial blood contains more water, fatty matter, fibrin, and less albumen than venous, it clots more quickly, and it contains more oxygen and less carbonic acid. Of these two latter gases, taken collectively along with nitrogen, from 40 to 50 volumes exist in 100 volumes of blood. Carbonic acid exists mechanically mixed, but also chemically combined in a slight degree with the blood whilst the oxygen is carried in the red corpuscles of the blood in a state of loose chemical combination and as we shall presently notice, the process of respiration appears chiefly to affect these red corpuscles.

Undoubtedly, however, the chief distinction between venous and arterial blood consists in the different proportions of oxygen and carbonic acid gas in the two kinds of blood. The arterial blood carries this oxygen out to the tissues to co-operate in the nutritive process, and also probably in the removal of effete matters from the body. As the result of the tissue waste and of the process of nutrition, a certain proportion of oxygen is absorbed, and carbonic acid, together with heat and watery vapour, are given off to constitute the characteristics of venous blood. On the due performance of this nutritive and excretory process, which occurs not only in the tissues but in the blood itself, many, if not all, vital actions certainly depend and it is an equally essential process to the well being of the organism that this carbonic acid and the other excretory products be returned by the venous blood for excretion, chiefly by the lungs.

Oxygen inhaled into the lungs is therefore (as

described in the article LUNG) brought into contact with the blood contained in the thin-walled capillaries of these organs, this gas passing into the blood and carbonic acid passing outwards in exchange into the air-cells. The oxygen, as already mentioned, appears to affect the red blood corpuscles and through them to give to arterial blood its scarlet colour. It was thus thought that oxygen caused the corpuscles to become flatter or biconcave, whilst carbonic acid distended them, or made them biconvex, the flatter condition causing them it was thought, to reflect light more powerfully, and thus to give a scarlet colour to the fluid. But it is more probable that the hemoglobin or red colouring matter, which forms the chief bulk of each red corpuscle, and which consists of globulin and hæmatin, is the seat of the characteristic respiratory changes. In man the hemoglobin may be separated in a crystalline, prismatic form, and it is found that hemoglobin absorbs oxygen very readily, and becomes of a brighter colour under the influence of that gas. The oxygen would thus appear to be held in the blood in some peculiar kind of chemical combination exerted through the red corpuscles. If, on the contrary, hæmoglobin be deprived of oxygen, or be deoxidized, it becomes of the characteristic venous or purple colour, and as the colour of the blood is solely due to the red corpuscles it is easy to conceive that the intimate change of colour seen in respiration has its seat in these minute bodies. The red corpuscles are therefore to be viewed not only as oxygen carriers but also as most nearly concerned in the nutrition of the organism. It is lastly to be remembered that even pure arterial blood contains a certain percentage of carbonic acid, whilst venous blood similarly is not wholly devoid of oxygen.

Having thus noted the chief changes which result in the performance of respiration in the air and blood with which it is brought in contact, we may in the last place glance at the other products and surfaces involved in the respiratory process. In addition to the carbonic acid given off by the lungs the presence of watery vapour in expired air has already been mentioned. The skin becomes correlated to the lungs in the most intimate manner as a respiratory agent chiefly from the fact that through this channel a large amount of watery vapour is got rid of, as well as a certain amount of carbonic acid and possibly a small quantity of urea. As mentioned under PERSPIRATION (which see) the amount of watery vapour given off by the sweat glands has been calculated at 11 grains per minute, or, as estimated by Valentin, about 11,744 grains or 1½ lbs of watery vapour is given off per day. Further details regarding the work of the skin in thus excreting watery matters will be found in the above article. The quantity of carbonic acid given off by the skin does not exceed $\frac{1}{16}$ th or $\frac{1}{24}$ th part of that excreted by the lungs, whilst the quantity of urea given off has not been exactly estimated. Minimally the quantity of the latter substance excreted cutaneously must be very small, the kidneys (which see) forming the chief organs of elimination of urea.

In lower animals (for example, Amphibia—Frogs, Toads, &c.) the skin plays even a more important part in the respiratory process than in man. These animals may live for months after the lungs have been cut out, respiration being carried on by the skin alone. Bischoff found that after cutting out the lungs of frogs $\frac{1}{4}$ cubic inch of carbonic acid was exhaled from the skin in eight hours, a frog under ordinary circumstances exhaling only about $\frac{1}{4}$ cubic inch of carbonic acid by his skin and lungs together in six hours. In lower animals, and in man also, if the skin be covered with an impermeable varnish, death may result with symptoms of blood poisoning, as if because of the process of excretion being hindered,

although Laahkewitch maintains that death in such cases rather results from loss of temperature. As an excretory channel, therefore, the skin co-operates in the most intimate manner with the lungs or respiratory organs, this co-operation being familiarly seen in the copious exhalation from the skin during violent exercise, or in the augmentation of the skin excretions in cases of lung disease, the skin in either case taking on itself a share of the work of the respiratory organs.

With regard to the control of the respiratory movements it may be noted that respiration is essentially an involuntary act, that is, it is in general carried on without immediate or direct appreciation by the mind or will, although it can be brought under the domain of volition when desired. Thus in speaking, in singing, and other voluntary acts, the function is brought under the control of the will. The movements of respiration appear to be under the special control of that portion of the cerebro spinal axis known as the *medulla oblongata*. This centre acts automatically, but its action is modified by impressions received from the lungs and other organs, which it transmits by reflex action (which see) to the *phrenic* and other nerves concerned in the respiratory movements. The brain itself may participate in the control of voluntary respiration, but the *medulla oblongata* apparently concentrates and regulates all sensations or impressions wherever derived, and which refer to this function. The chief centripetal or sensory nerves (see NERVOUS SYSTEM) engaged in controlling the respiratory function are the pneumogastric nerves, the branches of which are distributed to the lungs.

Respiration, when impeded or stopped for any lengthened period, produces the death of the organism, through the failure of the aerating or oxygenation of the blood. *Asphyxia* or suffocation is thus induced, and to this fatal result the mechanical cause or obstruction to respiration, whatever it may be, as well as the resulting chemical action of non-aeration of the blood, both contribute. The circulation being retarded on account of the respiratory movements being impeded or ceasing the right ventricle of the heart no longer sends its blood freely to the lungs, but becomes engorged, along with the right auricle. Convulsions occur because of the nerve centres being deprived of duly oxygenated blood, and the animal finally dies, with its heart's right cavities distended with venous blood, with its lungs similarly engorged, and other organs of the body also. It has been found that asphyxia varies in the rapidity of its fatal effects according to the manner in which it is induced. A dog deprived of air by simple obstruction of the windpipe continues to respire on an average for 4 minutes 5 seconds, the heart's action continuing for 2 or 3 minutes on an average after the cessation of respiration. If the animal be plunged in water, $1\frac{1}{2}$ minute appears to be the extreme limit of the continuance of respiratory movements; the comparative rapidity of death by drowning being due to the fact that whilst air then escapes from the lungs water also freely enters, since it was found that a dog submerged in water for 2 minutes with his windpipe plugged recovered, whilst another with the windpipe unobstructed died.

The absence of a sufficient quantity of oxygen in the blood constitutes the chemical explanation of asphyxia, and it is curious, lastly, to note that animals which hibernate or pass the winter in a torpid state, in which the respiratory function is in abeyance, suffer little or no evil effects from continued exposure to carbonic acid—a result dependent on the slow, imperfect manner in which the processes of respiration and blood aeration are carried on. Dr Marshall Hall thus kept a hibernating bat for

16 minutes, and a lethargic hedgehog for $22\frac{1}{2}$ minutes under water, without either sustaining the slightest injury. And Spallanzani kept a hibernating marmot for 4 hours in an atmosphere of carbonic acid with the same result.

The respiration of plants may be lastly noted in a very brief manner by way of conclusion to this subject. In plants, as already remarked, and by means of the leaf surfaces, carbonic acid gas is inhaled and free oxygen exhaled, these characteristic actions constituting a chief distinction between the animal and plant worlds. When the plant is exposed to the atmosphere, and in the presence of sunlight, the green *chlorophyll* or colouring matter of plants possesses the power of decomposing the carbonic acid and of retaining or fixing the carbon for the uses of the plant economy, whilst free oxygen is returned to the atmosphere. In this way, by supplying the atmosphere with oxygen, plants counteract the effect of animals which load the air with carbonic acid. The violet rays of light appear to most powerfully effect this decomposition, which proceeds very vigorously in the leaves of aquatic plants. There is, however, a true respiration in plants, consisting in the absorption of oxygen from the atmosphere, the oxidation of certain organic matters, and the evolution of carbonic acid and water. This process presents many striking points of contrast with that of assimilation above referred to. It takes place in all living cells, and not only in those containing chlorophyll, and light is not essential to it. Its effect on the composition of the plant substance is the reverse of that of assimilation, and from the point of view of energy it also appears as directly opposed to the assimilative process. It is accompanied by an evolution of heat. Leaves also exhalate watery vapour by a process of *transpiration*, and this process appears to be modified by light and to proceed most actively on the under surface of the leaf. The little openings known as *stomata* are concerned in transpiration.

RESPIRATION, ARTIFICIAL. See DROWNING. **RESPIRATOR**, an instrument invented by Mr Jeffreys as a mouth covering, the use of which is to give warmth to the air inhaled into the lungs. It is constructed of a series of layers of very fine silver or gilt wires placed closely together, through which the air passes and repasses in breathing. When the breath is exhaled through these, the metal, which is of great conductive power, is heated thereby, and this heat it gives out again to the inhaled air before it passes into the lungs. By this means the bad effects which might accrue from breathing air at a very low temperature are obviated. More modern instruments are now more simply constructed, and are frequently employed to secure the inhalation of a medicated atmosphere, containing a layer of lint or wool on which a few drops of terebene, eucalyptol, or other antiseptic are placed.

RESTITUTION OF CONJUGAL RIGHTS, in English law, is where either the husband or wife, without sufficient reason, lives separate from the other in which case, if either party desire it, the divorce and matrimonial court may ordain them to come together again.

RESTORATION, in English history, refers to the re-establishment of Charles II on the throne after an interregnum of eleven years and four months, from January 30, 1649, when Charles I was beheaded, till May 29, 1660. The Restoration was appointed by various statutes to be held as a festival in the Church of England, but its observance was abolished in 1859, by act of Parliament.

RESULTANT. See MECHANICS.

RESURRECTION (Latin, *resurgere*, to rise again), signifies the rising again of the body from the dead.

to be reunited to the soul in a new life. It has formed a part of the belief of the Christian church since its first formation, and has been embodied as an article in each of the creeds. There are traces to be found of such a belief among heathen nations from a very early period. It was the people, however, rather than the philosophers, who entertained the idea of a resurrection, accompanying their almost universal belief in the immortality of the soul. They held a kind of loose notion that the soul was still embodied after death, and could take pleasure in most of those things it had enjoyed during its earthly lifetime. Among the philosophers, on the other hand, the immortality of the soul was not denied, but from erroneous notions as to the necessary pollution of matter, they considered that the great benefit of death to the soul would be that it should for ever be freed from contact with the body, that, being always immaterial itself, and delivered from every connection with matter, it should ever remain unconfined and incorrupt.

There can be little doubt that the Jews, particularly those of later times, held the doctrine, though it would be difficult to point to any express indication of it in the Old Testament. A text that great stress has been laid on is the passage in Job xix 23-27, but critics have shown that the rendering in the authorized English version, which in the form there given is certainly expressive of the doctrine, is not the correct one. Instead of 'in my flesh might be read 'from my flesh', which certain critics hold to be equivalent to *out of or detached from*, though there are others who consider it equivalent to *looking from*, in which case the meaning of the passage would be very much the same as that expressed by the English version. There are, however, other passages in Job, as chap vii 9, xiv 11, 12, 14—which have been cited to show that the patriarch was ignorant not only of the resurrection but of the future state, but these may mean nothing more than that, in this present life and present scene, man, after his departure, shall take no more part. The doctrine is evidently alluded to in Isaiah xvi. 19 'Thy dead men shall live, together with my dead body shall they arise. Awake and sing, ye that dwell in dust, for thy dew is as the dew of herbs, and the earth shall cast out the dead,' on which passage Lowth has the following comment 'It appears from hence that the doctrine of the resurrection of the dead was at that time a popular and common doctrine for an image which is assumed to express or represent anything in the way of allegory or metaphor, whether poetical or prophetic, must be an image commonly known and understood, otherwise it would not answer the purpose for which it is assumed.' A plainer passage than this occurs in Daniel, chap xii 1-3, which distinctly affirms that 'many of them which sleep in the dust of the earth shall awake, some to everlasting life, and some to shame and everlasting contempt.' A description which, as a writer remarks, 'so exactly corresponds with the Christian description of the last judgment and the general resurrection, that it must require the greatest ingenuity to give any other sense to it.' That the belief in the resurrection was of old standing, and almost universally held among the Jews at the time of Christ, is evident from various circumstances, but particularly from the position occupied by the Sadducees, a sect numerically small, and having as its most characteristic feature the denial of the resurrection, along with general contempt for the ancient faith (Matt. xxii. 23, sq., Luke xx 27, sq., Acts xxiii. 6-8). Beyond doubt, however, it was the gospel that 'brought life and immortality to light.' At best the notions of a resurrection and

future state current prior to the advent of Christ were dim and undefined, and it remained for him to set them in a full clear light, and give evidence and pledge of their reality by his own resurrection. With regard to the information conveyed to us in the New Testament on the doctrine of the resurrection, we are taught that it will be *universal*, extending to the wicked as well as to the righteous, John v 28, 29, Rev xx 13. Another point apparently set before us is that there shall be identity, in some sense, between the body which died and the body which shall be raised. There seems an evident connection between the works, good or evil, performed in the body, and that body which shall be raised to receive punishment or reward, 2 Cor v 10. As regards the resurrection of the righteous, the body, though identical, shall be wonderfully altered, an alteration in some sense typified by the glorified body of our Lord, Phil. iii 21. This subject is pursued very fully in 1 Cor xv., see also Luke xx 35, 36. Few subjects of speculation can be more interesting than the nature of the spiritual body or the manner in which it shall be constituted so as to correspond to the enlarged powers of the soul. On this subject see Dr Goulburn's Bampton Lectures, and the highly interesting and philosophical work of Mr Isaac Taylor, on *The Physical Theory of Another Life*. Another most striking feature of the resurrection is its close connection in very many points with the Redeemer. It is his work which has procured it for us. 'As in Adam all die, so in Christ shall all be made alive.' See also 1 Pet i 3, 4, John v 28, xvi 24, Col iii 4. As regards the time of the resurrection all that appears clear is that it shall be at the end of this present earthly state, and that it shall be connected with the coming of our Lord to judge the world, 1 Thess iv 16. This passage teaches us further that first, in point of time, the departed saints shall be raised, and next, that the saints then living upon the earth shall be changed, while, as it is elsewhere declared that the saints shall be assessors with their Lord in judgment, it would seem probable that the resurrection of the wicked will be subsequent to that of the righteous. In Rev xx a resurrection is spoken of as taking place at the commencement of the period usually termed the millennium.

On the opinions entertained by the early Christian church on the subject of the resurrection little need be said. As early as the date of the first epistle to the Corinthians there seem to have been those who confounded the figurative resurrection of regeneration with the literal resurrection of the dead, and as Gnosticism developed itself opposition to the Catholic doctrine of the resurrection became more frequent. Everything corporeal was considered of necessity defiled, and thus a pure and perfect future state, it was concluded, must be free from all contact with body. These notions, however, seem neither to have been very extensively received nor to have lasted very long. The reader will find much valuable information on this point in Neander's (*Church History* (vol. ii)) and in his *Antiquities*.

Connected with this subject is the resurrection of Christ from the dead, which is at the basis of the Christian faith. 'If Christ be not risen then is our preaching vain, and your faith is also vain.' The evidence of this fact is of such a nature as might be expected to dispel all doubt on the point from every unprejudiced mind. During the forty days which intervened between the resurrection and the ascension of Christ he is stated to have manifested himself on no fewer than eleven different occasions to his disciples, to those who knew him, to those who had been for upwards of three years his intimate companions and friends, to those from whom he had

been at the utmost only a very few days separated. Some general characteristics, moreover, of this evidence lend more than ordinary strength to the impression which it naturally produces. These, however, we can only briefly indicate here. They are: (1) *The variety of circumstances* under which the risen Saviour appeared. He made himself manifest not to one person or set of persons only at different times, nor to persons only whose frame of mind at the moment may be supposed to have been the same. (2) *The circumstantiality* of the testimony given by the different witnesses. It is neither vague nor hesitating, but clear, definite, and positive. (3) *The simplicity and apparent truthfulness* with which the witnesses describe their impressions when the Saviour appeared to them, as in the case of the two disciples going to Emmaus. (4) *The evidence is rendered still more worthy of our attention* when we consider that *the event borne witness to was completely unexpected by the witnesses*. Those who deny the objective reality of Christ's resurrection attempt to explain it away on various grounds, but the primitive disciples undoubtedly believed that he died and rose on the third day. Some it should be noted believe that the accounts of the Gospels point to a resurrection and manifestation of Jesus not in the material and mortal body but in some spiritual way little understood as yet. See Westcott's Gospel of the Resurrection (1866). Mearns's Resurrection of Jesus Christ (1877). Milligan's Resurrection of our Lord (1881). and Brundt. Die evangelische Geschichte und der Ursprung des Christentums auf Grund einer Kritik der Berichte über das Leiden und die Auferstehung Jesu (1893).

RESURRECTIONISTS, or **BODY SNATCHERS**, persons who formerly made a business of stealing newly buried corpses from graveyards and selling them to teachers of anatomy. Before the passing of the Anatomy Acts which regulate the supply of subjects for anatomical dissection and especially during the early years of the nineteenth century many circumstances combined to render the loathsome practice of resurrectionism a highly remunerative and highly flourishing one. Those who engaged in such an occupation were of course men of the most contemptible character, but their illegal work it would appear was rendered comparatively safe by the bribing of sextons and grave-diggers to wink at their operations. When the practice was at its height many methods of protecting graves were adopted such as covering them with iron gratings or watching beside them each night for a certain period. The celebrated case of Burke and Hare (see BURKE AND HARE) revealed the fact that the more unscrupulous resurrectionists were also systematic murderers and it led to the passing of the first Anatomy Act in 1832. Some cases of resurrectionism have occurred in more recent times, but their motives were entirely different and resurrectionism may happily be regarded as a thing of the past.

RESUSCITATION. See DROWNING.

RETAINER in English law is the instruction given by a man to a solicitor to prosecute a suit or other legal business for him; also a document given by a solicitor to counsel (a barrister) engaging him to appear for a party. When the counsel is engaged for a particular suit the document is called a *special retainer*, and when he is engaged for all matters of litigation in which such party may be at any time involved it is called a *general retainer*, and remains in operation till revoked, though it may also be considered cancelled by the counsel in the event of his not being called on to appear when a case is actually tried. The retainer is in all cases accompanied by a preliminary fee to the counsel, in order to insure his

advocacy. This is called a retaining fee. A general retainer is usually given to eminent counsel only, and is done with a view to prevent his services being obtained by an opponent. General retainers are more commonly given on behalf of corporations, companies, &c. than on behalf of individuals.

RETAINING WALL, a wall erected for the purpose of confining a body of water in a reservoir, or for resisting the thrust of the ground behind it. Without such a wall the earth would lie at a considerable angle off the perpendicular. The angle it makes with the horizontal is called the angle of repose and varies with the nature of the material. The amount of resistance necessary to be afforded by the wall depends partly on the material and partly on the angle of repose. For the pressure against the wall is produced by the material filling the space between the angle of repose and the face of the wall, and the less this angle the greater the quantity of material required to fill the space and the heavier the material the greater the pressure. It will hence appear that the great condition to be observed in the erection of these walls is that the sum of the forces tending to displace the wall shall be exceeded by the force tending to produce stability. As a general rule the thickness of retaining walls is made one third the height of the bank which they are intended to support. In estimating the requisite thickness of the wall account must be taken of the different ways in which it may be displaced, as by overturning, slipping, along its entire base or the giving way of the upper parts while the base remains. In reservoir walls of masonry the thickness should be made practically double that of ordinary earth retaining walls. See RESERVOIR.

RETIFORD or **EAST RETIFORD**, a town in Nottinghamshire, England, 28 miles N.W. of Nottingham, pleasantly situated on the railway from London to York, the Chesterfield Canal, and on the Idle, here crossed by an iron bridge connecting it with West Retford. It consists of several streets, well built and paved and a market place lined by good houses. It has a large and handsome parish church of St. Swithun, mainly in Perpendicular style, restored in 1845; several dissenting chapels; a grammar school founded by Edward VI.; a town hall with county court offices; a corn exchange; a court house; a hospital and several almshouses. The chief industrial establishments are iron foundries, paper mills, india rubber works, and corn mills, and there is a considerable trade in corn, malt, cheese, butter, eggs, meat, horses, &c. East Retford from a very early period sent a member to the House of Commons, but owing to corrupt practices the franchise was in 1826 thrown open to the hundred of Basethlaw, and in 1885 the borough was merged in the county. Pop. in 1881, 9748; in 1891, 10,603; in 1901, 12,339. **WEST RETIFORD** is included within the municipal borough of Retford. Pop. (1891) 821.

RIEHEL, a town of France, department of Ardennes, on the right bank of the Aisne, and on the Ardennes Canal, 23 miles south-west of Metz. It was formerly fortified and has a communal college and manufactures of marines and cashmires. Its trade is facilitated by the Ardennes Canal. The church of St. Nicholas dates in part from the thirteenth century. Pop. (1896) 6234.

RETINA, in anatomy, a membrane of the eye, formed by an expansion of the optic nerve and so constituted as to receive the impressions which result in vision. See EYE.

RETIREMENT, in army and navy, is the withdrawal from the service with the retention of all or a portion of the pay. In the British army the retirement of officers is either voluntary or compul-

sory Officers below the rank of major general may be permitted after twelve years' service on full pay to retire with retired pay or gratuity according to a certain scale. All officers must retire at fixed ages, according to their rank, receiving corresponding retired pay (See ARMY). In the navy admirals or vice admirals are placed on the retired list at sixty-five years of age, rear admirals at sixty, captains at fifty-five, commanders at fifty, and lieutenants at forty-five, with the option in each case of retiring five years sooner. In the army estimates large sums annually appear under the head of retired pay, half pay &c. for officers; thus, in 1898-99 the total amounted to £1,567,800, while in 1901-02 the corresponding total was £2,271,000. The total for the navy in the last mentioned year was £790,900.

RETORT, a vessel, generally of glass, used in chemistry for distilling liquids. Retorts consist of a flask shaped vessel to which a long neck or tube is attached. The liquid to be distilled is placed in the flask and heat applied. The products of distillation condense in the cold neck of the retort, and are collected in a suitable receiver.

RETRENCHMENT, in the art of war, any kind of work raised to cover a post, and fortify it against the enemy, particularly a line of works formed so as to cut off parts of a fortress, and enable the garrison to continue the defence after the parts outside of it are taken. See INTRENCHMENT.

RETROGRADE, the apparent motion of a planet among the stars when it is in opposition to the motion of the sun in the ecliptic. The motion of a planet in the direction from right to left is said to be direct. The curve described by a planet among the stars, when its motion is retrograde, is called the arc of retrogradation, or the arc of retrogression.

RETROGRADE DEVELOPMENT and **METAMORPHOSIS** the name applied in zoology to certain phenomena observed in the development of some animals, whereby the reproductive body or the embryo itself appears on completing its embryonic life, to assume a state inferior to that which it previously exhibited. Thus, as well seen in the history of many of the free floating reproductive bodies of Hydrozoa or Zoophytes, which appear in the form of jelly fishes (which see) or Medusae (which see), the beautiful glassy organism, after maturing the eggs, and discharging its generative functions, appears to shrivel up and to undergo a retrogression in its structure prior to its final dissolution and disappearance. This phenomenon would therefore be termed one of 'retrograde metamorphosis.' But in the history of other organisms, such as many of the lower Crustaceans—we may find an animal in its young or immature state to present a structure of very much higher organization to that which it finally assumes, the mature form thus retrogressing from the structure of the embryo. Thus, as mentioned in the article LERNEA (which see) the young Lernean appears as a free swimming body, provided with eyes, antennae and locomotive limbs. But when the mature state is attained these appendages disappear, leaving the adult as a fixed sac-like structure, destitute of all active organization. A still more notable instance is that of the Tunicata (Ascidians or Sea Squirts), whose larvae have all the chief characters of vertebrate animals, whilst the mature animals (except Appendicularia) are almost destitute of them. These animals, formerly classed as Mollusca are now grouped with the Vertebrata in the phylum Chordata.

RETROGRESSION OF THE MOON'S NODES, the motion of the moon's nodes in the direction opposite to that of the sun's motion in the ecliptic. The plane of the moon's orbit makes an angle of about $5^{\circ} 8' 48''$ with the plane of the ecliptic, and the moon

in one revolution round the earth is twice in the plane of the ecliptic, once in each half revolution. The two points in which the moon's orbit meets the plane of the ecliptic are the moon's nodes. It is found that the moon's nodes slowly change at each revolution of the moon, in the direction from left to right, and that they make a complete revolution round the earth in 18.6 years. The ascending node is that where the moon enters the plane of the ecliptic from the south; the descending node is that at which the moon enters the plane of the ecliptic from the north.

RETURN SIROKE. See RICHIEUX.

RETZ, JEAN FRANÇOIS PAUL DE CONDÉ, CARDINAL DE, was born at Montmirail in 1613; and, contrary to his own inclinations, was designed by his father, who was general of the galleys for the church. His instructor was the celebrated Vincent de Paul. In 1643 he received a doctorate at the Sorbonne, and was appointed coadjutor of the Archbishop of Paris. Although earnestly desiring to enter the military service, Condé was too politic and ambitious not to bring his talents into action in the career forced upon him, and although levity and vivacity led him to commit many actions very inconsistent with his station, his numerous amours, and affairs of honour settled by the young abbe with the sword—yet his impassioned eloquence won him the favour of the Parisians, and often served to appease the indignation of the clergy. His talents and address, together with his evident ambition of political distinction, which too often degenerated into cabal against the court party and the ministers, could not fail to draw the attention and excite the hatred of the all-powerful Richelieu, and, after his death, of Mazarin. The Fronde, or the party opposed to the court and Mazarin, received the coadjutor as a man whose genius and popularity made him a valuable accession, and De Retz embraced their cause with zeal. The intrigues which agitated the court, the various insurrections of the people and the Frondeurs, &c., offered him a wide field for the execution of his projects, and when the court finally saw itself compelled by a decree of the parliament to release the Prince Condé, and Mazarin himself (see MAZARIN) was obliged to leave France, De Retz seemed to have attained his object, and to have it in his power thenceforth to hold the reins of government. But Mazarin soon returned from his banishment, more powerful than ever. The Fronde, which had never been firmly united, and the members of which, with the exception of Condé and De Retz, were weak and wavering, was dissolved, and soon after the latter, by the mediation of the court, and not without the management of his enemy Mazarin, had obtained the cardinal's hat, the storm which had just before threatened Mazarin burst upon him. At the command of the court, or rather of Mazarin, he was unexpectedly seized and confined in the castle of Vincennes, whence he was subsequently removed to Nantes. Here he found means to escape, and, perpetually pursued by the minions of Mazarin, wandered for nearly eight years through Spain, Italy, Holland, Germany, and England. In Pope Innocent he found a powerful support, and his death was a heavy loss to Retz, as his successor Alexander, who was in some degree indebted to him for his elevation, gave him no assistance. After the death of Mazarin in 1661 he was allowed to return to France, but not before he had solemnly promised never to take part again in political combinations. He now resigned his archbishopric, governed the abbey of St Denis, lived retired, restricted his wants, paid his immense debts, and, besides, distributed pensions to his friends. Reconciled with all parties, the man whose comprehensive mind had hitherto taken pleasure only in the tangled web of

politics now lived the quiet and retired life of a philosopher. 'Cardinal de Retz,' says Rochefoucault, 'has much elevation of mind, but more ostentation of courage than true courage, an extraordinary memory, readiness and elegance of expression. He seems ambitious without being so, and his attacks upon Mazarin were aimed less to subvert the latter than to render himself formidable and important to him. His imprisonment he bore with firmness, and he owed his freedom to his own boldness. As long as Mazarin lived he maintained his archiepiscopal see, unshaken by all the vicissitudes of fortune, when his enemy was no more, he voluntarily resigned it. As a cardinal he gained respect by his conduct in several conclaves. Although he had a strong propensity to pleasures and idleness, yet his activity was really astonishing as soon as it was awakened by circumstances. The presence of mind with which he was able to understand and turn to advantage the most unlooked for circumstances is worthy of admiration.' His posthumous *Memoires* (Cologne, 1718, three vols.) give an interesting picture of his character. A history of the conspiracy of Count Hiesco, in Genoa, which he wrote while a youth of seventeen years of age, with a visible predilection for his hero, shows the tendency of his mind—a fact which did not escape the notice of Cardinal Richelieu when he first saw this youthful production. In the last years of his life he rarely went to Paris. He died, however, in that city in 1679. The best edition is that published at Paris in the *Grands Ecrivains de la France* series (ten vols. 1872-90). An abridged edition was published at Paris in 1865 in one volume. See works by Chintolaize, Popin, Curmier, Gazier, and others.

RETZSCH, MORITZ, an eminent German artist, was born at Dresden on 9th December, 1779, and studied historical painting at the Academy there, under Professor Grunow. It is mainly, however, as a romantic painter that he has distinguished himself, some of his best works in this department being *Genoveva*, *Undine*, *The Erl king*, and *Sir Sintram*. Some of his studies also form Greek mythology, such as *Bacchus Asleep on the Panther*, *Cupid and Psyche*, and others, display a wonderful beauty in drawing and colour. Retzsch's illustrations of the great poets, comprehending the drawings executed by him for editions of Goethe's *Faust*, and the works of Schiller and Bürger, have rendered him deservedly famous. In 1824 he was appointed a professor in the Art Academy at Dresden. He died at Hoflossnitz, near that city, on 11th June, 1857.

REUCHLIN, JOHN (called also, in allusion to the signification of his name, *Kapnos*, diminutive of the Greek *kapnos*, smoke), was born at Pforzheim in 1455, of respectable parents. He distinguished himself at school by his industry and good conduct and the excellence of his singing procured him a place in the chapel of the Margrave of Baden, who appointed him companion, on his travels, to his son Frederick, afterwards Bishop of Utrecht. In 1473 Reuchlin accompanied that prince to Paris, and while there studied Greek under Hermonymus of Sparta, besides applying himself assiduously to Latin composition and Hebrew. In 1475 he proceeded to Basel and after some further time spent in the study of Greek began to teach that language, along with Latin and philosophy. At this time also he wrote his Latin dictionary, *Breviloquus, id est Dictionarium singularis Voces Latinas breviter explicans* (Basel, 1478), the first published in Germany. In 1478 he went back to France, and studied law at Orleans, while he taught, at the same time, the ancient languages. In 1481 he returned to Germany, and taught law and the belles lettres at Tübingen. Eberhard, count of Wurtemberg, soon after took him, as the best Latinist

in Germany, in his train on an embassy to Rome. The treasures of science which Lorenzo de' Medici had accumulated in Florence, and those of Rome, were thus opened to the curiosity of Reuchlin. The Emperor Frederick II. created him a noble of the empire in 1492. After Eberhard's death Reuchlin lived several years at the court of Philip, elector of the Palatinate. Here he enriched the Heidelberg library with manuscripts, and productions of the new art of printing. The elector having been basely calumniated at the Roman court, and even excommunicated, Reuchlin repaired again to Rome, and defended the rights of his prince with equal prudence and eloquence. He was subsequently appointed president of the court of the confederacy which had been established by the Suabian princes against the encroachments of the house of Bavaria. He was also engaged in translating the penitential psalms, preparing a Hebrew grammar and dictionary, and correcting the translation of the Bible. But in an age in which ignorance and priestcraft prevailed he could not fail of having enemies. A converted Jew, John Pfeffercorn, and Hoogstraten, an inquisitor, were the instigators of these blind zealots in their attacks upon Hebrew literature. They solicited and obtained from the Emperor Maximilian, in 1509, an order that all Hebrew works the Old Testament only excepted, should be burned, on the ground that they were full of blasphemies against Jesus Christ. The emperor, however, consulted Reuchlin, who assured him that these works, instead of injuring Christianity, contributed, on the contrary, to its honour and glory, since the study of them produced learned and bold champions to fight for the honour of the Christian religion, and that to destroy these books would be to put arms into the hands of its enemies. The order was thereupon recalled, but the effect of Reuchlin's action in the matter was to exasperate his enemies against him still more. A war of pens raged for ten years. On one side were Hoogstraten and the Universities of Paris, Louvain, Erfurt, and Mainz, on the other, Reuchlin and the most learned and enlightened men of all countries. Passages were extracted from Reuchlin's works, and their meaning perverted on the ground of which a charge was brought against him of being a heretic, and secretly inclined to Judaism. He was summoned in 1513 before the Inquisition at Mainz, which was presided over by Hoogstraten, his bitterest enemy, and by a decree of that tribunal his writings were consigned to the flames. This roused the indignation of the friends of classical literature, and the struggle waxed still keener and more general. An appeal was made to Pope Leo X., who referred the whole matter to the Bishop of Spire, and that prelate declared Reuchlin innocent, and ordered the monks to pay the expenses of the investigation. A counter appeal was made by Hoogstraten, but Reuchlin was again acquitted, this time by a commission of prelates held at Augsburg in 1516, and the pope issued a mandate that all proceedings against Reuchlin should be stopped. In the course of this contest appeared the *Lpistolæ Obscurorum Virorum*, in which the enemies of Reuchlin were heapd over with ridicule. Among the staunchest friends of Reuchlin during the controversy were Ulrich von Hutten and Franz von Sickingen, the latter of whom terrified the opponents of the scholar into silence by threats of vengeance. The opening, moreover, of the Reformation, to which Reuchlin himself in no small degree contributed, turned their minds into another direction. When, in 1517, he received the theses propounded by Luther he exclaimed, 'Thanks be to God, at last they have found a man who will give them so much to do that they will be compelled to let my old age end in peace.'

In 1518 he was appointed professor of Hebrew and Greek at Wittenberg, but sent his relative Melancthon instead. He subsequently resigned his judicial station at Stuttgart, to avoid being compelled to give a decision against his prince, Duke Ulrich, who had precipitately attacked the city of Reutlingen, and William of Bavaria appointed him professor in the University of Ingolstadt. The plague having broken out in Ingolstadt in 1522 he removed to Tubingen, where, retired from state affairs, he was again going to devote himself to study but sickness overtook him, and he died at Stuttgart June 30, 1522. Although suspected of a leaning towards Protestantism, he never left the Roman Catholic Church.

RÉUNION See BOTRON, ISLE OF

REUS a city of Spain in Catalonia, in the province and 10 miles west of Tarragona, in a plain at the base of a chain of hills, about 4 miles from the Mediterranean. It is divided into two parts, the ancient and the modern, the latter being distinguished by the superior architecture of the houses, and by the greater regularity of the streets. In the former is the principal square surrounded by spacious colonnades. Among the public institutions and edifices are the town house, the public prison, an hospital, the parish church, with a lofty hexagonal tower, a Franciscan convent now occupied by schools and a college, the theatre and the barracks. The principal branches of industry are the manufacture of cotton and silk stuffs, leather, casks, soft soap, machinery and imitation French wines. The trade is considerable. Pop (1887) 28,780.

REUSS two principalities of Central Germany, somewhat intermingled with other territories, but lying between Saxony, Bavaria and the Saxon duchies, and belonging to an older and a younger line. Area of the whole principalities 441 square miles. The surface of both principalities is mostly mountainous. The territory of the older line, usually called the principality of Reuss Greiz, consists of the lordships of Greiz and Burgk, and has an area of 122 square miles. These lordships are separated from each other the one being traversed by the White Elster, while the other lies along both banks of the Saale. The surface is better adapted for pasture than agriculture, rearing great numbers of horned cattle and sheep, but, scarcely raising grain sufficient to meet the consumption. The most important crops are potatoes and flax; hops also are partially grown. The weaving of woollen, linen and cotton fabrics is also among the principal occupations of the people. The capital is Greiz, and the only other town is Zeulenroda. The territories of the younger line also called the principality of Reuss Gera, Schleiz, Lobenstein, Ebersdorf, have together an area of 319 square miles. These territories are on the whole fertile and well wooded, raise sufficient grain to supply the consumption, and possess among their minerals marble, salt and iron. The capital is Gera, and other towns are Schleiz, Suhlburg, Hirschfeld and Lobenstein. The division into an older and a younger branch dates from 1616. Since 1668 all the princes of both lines have been called Heinrich (Henry). Both lines as well as the great majority of their subjects, are Protestants. The principality of Reuss Greiz had a population in 1900 of 68,396, Reuss Schleiz, of 18,993.

REUTER, PAUL JULIUS, BARON founder of the Reuter's Telegram Company, was born at Cassel on July 21, 1816. In 1849 he settled at Aix la Chapelle, where he collected and distributed news by telegraph to many of the chief towns of the Continent. Two years later he removed his head quarters to London and in 1858 he greatly extended the scope of his telegraph agency by undertaking to supply

English newspapers regularly with foreign news. From that time Reuter's Agency became more and more important every year, till at the present day it occupies a unique position, and carries on its operations in all parts of the world. In 1865 Baron Reuter obtained a concession from the government of Hanover for the laying of a cable from England to Cuxhaven, and about the same time he obtained another concession for a cable from France to the United States. In 1872 he obtained from the Shah of Persia the exclusive right of constructing railways, farming the customs, and working the mines, forests, and other natural resources in that country, but this concession was cancelled and one for establishing the Bank of Persia substituted. He was created baron (*Freiherr*) by the Duke of Saxe-Coburg-Gotha in 1871 and died at Nice on Feb. 25, 1899. The Reuter's Agency has for many years been a limited liability company.

REUTLINGEN a town of Wurtemberg, capital of the circle of the Schwarzwald or Black Forest, on the Echaz, a small affluent of the Neckar, 20 miles south of Stuttgart. It is an old but well built and attractive place, has generally narrow streets, contains three Protestant churches, one of them dating from the thirteenth century, and restored in 1894, a Roman Catholic church, a town house, gymnasium, real schools and other institutions. Its leather and textile industries are very important. It was incorporated with Wurtemberg in 1803. Pop (1895), 19,822 (1900) 21,491.

REVEL or **REVAL**, a seaport town of Russia, capital of the government of Esthonia, on a small bay in the Gulf of Finland, 200 miles s.w. of St. Petersburg. It was once a place of some strength, surrounded by strong walls, flanked with bastions, of which but still remains. It consists of two chief parts, the upper and the lower town, the former built on the top of a rocky hill. The upper town includes the castle, now the governor's residence, the cathedral and the residences of the nobility. The lower town or town proper, contains several churches, of which the chief are the Lutheran churches of the Holy Ghost and of St. Olaf and the church of St. Nicholas, the town hall, several guild halls, various schools, an arsenal, &c. There are also extensive suburbs. The harbour is excellent and is often visited by the fleet from Cronstadt. The principal exports are hemp, flax, corn, goats' hair, spirits and timber, the imports colonial produce, herrings, salt, wine, coal, dye stuffs, lead, cotton and silk goods, &c. Revel is much frequented for sea bathing. Pop (1897), 64,578.

REVELATION the knowledge of God and his laws directly communicated to man. According to theologians and other inquirers, we find among various nations traditions of an immediate revelation of the will of God communicated by words or works of supernatural significance or power. The nations of antiquity traced the origin of their religions, and even of their civilization, to the instructions of the gods, who, in their opinion, taught their ancestors as men teach children. As a child without the assistance of others would be incapable of acquiring knowledge, so the human race in its infancy could not have made, it is argued, the first step in the arts and sciences without a guide, and even if external nature in its various objects and phenomena were a sufficient guide to that kind of knowledge and skill which is necessary to provide for the bodily wants of man, can it be supposed that this nature could set in action his moral faculties and open to his view the world of spiritual being? To reason, which derives its knowledge from sensible experience, the world is a riddle. The solution of this riddle—a knowledge of

God and his relation to the world—could have been given only by God himself. Whatever knowledge man possesses of this subject must have been received directly by oral communication from the Deity, without which he could never, or at least not so soon nor so surely, have acquired it. In this revelation of himself God adapted his communications to the comprehension of the beings for whose instruction it was intended, and we may distinguish three periods in this education of the human race in divine things. The earliest revelations, made in the patriarchal age, were common to the progenitors of all people. These earlier notions were preserved pure, and gradually enlarged during the Mosaic period by successive revelations to chosen individuals, with whom the Bible makes us acquainted under the name of prophets, from Moses to Malachi. God finally completed his revelations through Christ. Many theologians of the present day hold the view that all revelation of God's nature and purposes comes in the ordinary course of nature, and never by supernatural interposition. In this view God reveals himself in the order of the material universe, in the course of human history, and in the voice of conscience, and revelation is a continuous and unending process. See CHRISTIANITY, INSPIRATION, ETHICS, GOD, &c.

REVELATION, BOOK OF. See APOCALYPSE.

REVELS, MASTER OF THE, an officer in former times appointed to superintend the revels or amusements, consisting of dancing, masking, &c., in the courts of princes, the mans of court, and noblemen's houses, during the twelve Christmas holidays. But in the reign of Henry VIII the office was attached permanently to the court, and his duties included the charge of the tents, pavilions, &c., in a royal progress, as also of the dresses and masks used in court entertainments. The office became extinct in the reign of George III.

REVERBERATORY FURNACE, a furnace in which the material is heated without coming into contact with the fuel. Between the fireplace and the bed on which the material to be heated lies a low partition wall called a fire bridge, is placed. The flame passes over this bridge, and plays down against the bed, being reflected or *reverberated* (whence the name) by a flat arch which surmounts the whole.

REVEREND, a title of respect given to ecclesiastics. The religious in Catholic countries are styled *reverend fathers*, and the abbesses, prioresses, &c., *reverend mothers*. In England bishops are *right reverend*, archbishops *most reverend*, deans *very reverend*, and the lower clergy *reverend*. In Scotland the principals of the universities, if clergymen, are *very reverend*, and likewise the moderator of the General Assembly; all the other clergy are simply *reverend*. The title of *reverend* is also commonly assumed by Dissenters, though some of them repudiate it.

REVERSION, the residue of an estate left in the grantor, to commence in possession after the determination of the particular estate granted by him. The estate returns to the grantor or his heirs after the grant is over.

REVERSION, in the doctrine of annuities, is the present right to a payment to be made at some future time, conditional upon certain contingencies, as in the case of an insurance failing to be paid on the attainment of a certain age, or on the death of the assured. The value of a reversion is easily ascertained when the date of its emergence is fixed, and thus a person who has a right to receive a certain sum of money at a given time is enabled to sell this right for its just value. If, for example, he now sells his right to receive £100 five years hence, the

money he receives for it should, at a given rate, compound interest, accumulate so as to reach £100 at the expiry of five years. The question to be resolved is simply this, What sum annually accumulated at the assumed rate will in five years amount to £100? The solution of this question is easily obtained by the rules of interest. The value of a reversion, however, which depends on such a contingency as the death of a given individual, it will be at once perceived, can be ascertained neither so easily nor so accurately. Reversions of this nature are calculated on an observed or assumed rate of mortality, and to facilitate such calculations extensive tables, termed *annuity tables*, have been constructed on various hypotheses of mortality, and computed at various rates of interest. Many intricate and interesting questions arise in connection with this subject, which cannot, however, be discussed here. Various papers treating the matter will be found in the Assurance Magazine and in special works dealing with annuities, &c.

REVELLEMENT (French, *revêtement*), in fortification, is a retaining wall placed against the sides of a rampart or ditch. In field works it may be of turf, timber, hurdles, and the like, but in permanent works it is usually of stone or brick. The exterior faces of these walls are considered as the scarp and counterscarp of the ditch. Before the time of Vauban it was the practice to raise the scarp revetments from the bottom of the ditch to the top of the parapet, but as this rendered it easier of destruction by the enemy's artillery, that engineer adopted the principle, afterwards followed generally, of raising the wall no higher than the crest of the glacis, or about 7 feet above the natural ground, the exterior of the parapet above that being left at such an inclination to the horizon that the earth would support itself. The depth of the ditch being usually 24 feet, the height of the revetment will thus be 31 feet. When the revetment is this height, that is, when it reaches the crest of the glacis, it is called *full revetment*, and when it only attains the height of the natural ground *demi revetment*. In order to impart additional strength to the walls, outward counterforts or massive buttresses are built up along with them at intervals of about 15 feet. Revetments have been constructed in four different forms, named from their profiles *rectangular*, *leaning*, *sloping*, and *counter sloping*. The first of these is a wall of equal thickness throughout, the second differs from it only in being inclined towards the bank supported, the third slopes on its outer face, while its inner face is vertical, and the fourth is the reverse of this. *Hollow or counterarched* revetments are those constructed with counterarches, forming vaulted defensive galleries, or filled in with earth.

REVIEWS. See PERIODICALS.

REVISAL, among printers, a second or third proof of a sheet to be printed, taken off in order to be compared with the last proof, to see whether all the mistakes marked in it are actually corrected.

REVISING BARRISTER, in England, a barrister appointed annually for the purpose of examining or revising the list of parliamentary voters, and settling the question of their qualification to vote—duties performed in Scotland by the sheriff substitute. A revising barrister is appointed for each of the districts into which England is for that purpose subdivided. His appointment is for one session, but he is usually reappointed. King's counsel never hold this post. The revising barristers' courts are held throughout the country in the autumn.

REVIVAL, a term applied to religious awakenings in the Christian Church, and to the occurrence of extensive spiritual quickening and conversion in

the general community. The first great revival in Europe was the Reformation, which awoke the church from the sleep of centuries, and gave a new impulse to spiritual freedom, Christian civilization, and the arts of life, and which in Great Britain has left its indelible impress upon the church, the constitution, the laws, and the national character. When religion had degenerated into formalism in this country in the seventeenth century a second revival of spiritual interest was accomplished through the instrumentality of the Puritans, whose influence is still reflected in our religious literature, more especially in the writings of Owen, Baxter, and Howe. The church once more sank into a state of sloth and apathy, and infidelity and immorality prevailed in this and other lands in the eighteenth century. From this condition Great Britain was aroused by the preaching of Whitfield, the Wesleys, Rowland Hill, Romaine, Venn, Newton, Cecil, Fletcher, and a multitude of other earnest men, who were raised up and qualified for the exigency by the divine Spirit, and enabled to declare gospel truth with irresistible power and extraordinary success. Coincident with this movement was the origin of missions to the heathen, arising from the general recognition by Christian men in all religious denominations of the obligation devolving upon them, equally with the first apostles of the cross, in virtue of the divine command and commission, 'Go into all the world and preach the gospel to every creature.' The history of the Church of Scotland presents several remarkable instances of religious quickening and revival in connection with its early struggles for religious freedom. In the year 1596 the General Assembly took the lead in a movement for a national confession of sin and reformation of manners, the result of which may be briefly summed up in the words of Calderwood the historian, who records that 'there have been many days of humiliation for present judgments or imminent dangers, but the like for sin and defection was never seen since the Reformation.' A local, but not less remarkable, revival of vital religion took place at Stewarston in Ayrshire in 1625 and extended throughout that county, and is described by Fleming in his Fulfilling of the Scriptures as a 'great spring tide of the gospel, not of a short time, but of some years continuance, and he compares it to 'a spreading moor burn the power of godliness advancing from one place to another, which put a marvellous lustre on those parts of the country the saviour whereof brought many from other parts of the land to see its truth.' In the year 1742 revivals of genuine religion took place in various parts of Scotland, especially at Cambuslang and Kilsyth, where some of the most eminent divines of the time took an active share in the ministrations. Kilsyth was again the scene of a religious revival in 1839, when the Church of Scotland was in the heat of the memorable struggle which ultimately terminated in the Disruption, and the movement on this occasion extended to Dundee, Perth, Blairgowrie, Ancrum, Jedburgh, Kelso, and to Ross-shire and Sutherlandshire, in the north of Scotland. The Principality of Wales has also from time to time been the scene of notable revivals, chiefly under the ministrations of the Calvinistic and Wesleyan Methodists, dating from the eighteenth century. But it was reserved for recent times to witness in America and Great Britain perhaps the most remarkable movement of this kind which has been witnessed in the religious world since the era of the Reformation. Movements of this nature, but of limited extent, have not been infrequent in the American churches since the time of Jonathan Edwards (1736), when almost the entire population of Northampton was received into the communion of the Christian Church,

and when in the New England states alone, within the space of two or three years, it was estimated that from 30,000 to 40,000 persons became the subjects of genuine spiritual conversion. Another wide-spread revival took place in the States in the year 1830. The great revival which subsequently extended to the British Islands, and has been experienced with more or less power throughout almost every part of the world where the gospel is preached in purity and sincerity, originated in the United States in 1857. It commenced in the general diffusion through the churches of a spirit of prayer, and has also been traced in some degree to the extreme worldly losses sustained by the American people in the crushing commercial disasters which closed the year 1857, and the nature and extent of which may be inferred from the fact that the commercial failures of the first three months of 1858 amounted to 1500, when numbers of banks were stopping payment every week. About the same period a convention of ministers was held at Pittsburg, from which there issued an address on the 1st of January, 1858, recommending practical measures for the revival of true religion, such as preaching on the subject and domiciliary visitation, to induce families of all ranks in society to attend public worship. New York and Philadelphia were the principal centres whence spiritual influences spread through the country, till the revival became universal in the States, embracing all denominations. Even the secular newspapers daily recorded its progress and effects. Meetings for prayer were held, often during business hours, in stores, counting houses, churches, theatres, and places of public resort, and were attended by persons in every condition of society. The wave of religious influence swept over the nation, including hamlet, village, and populous city, from the forests of Maine, the crowded seaports, the manufacturing towns, the new cities of the west, from the villages of the south west and even from the mines and mountains of California. Constant reports of the profound religious feeling of the people were received in New York, and published at large in the daily press. Boston, Baltimore, Washington, Richmond, Charleston, Savannah, Mobile, New Orleans, Yorksburg, Memphis, St. Louis, Pittsburg, Cincinnati, Chicago, and other cities, all shared in the work which permeated, in a word, every part of the republic, embracing in its gracious influence the high and the low, the rich and the poor, the learned and the ignorant. Vast numbers were added to the membership of the churches, which still appear to participate in the effects of the earnest spirit then manifested. In the summer of 1859 the revival extended to the north of Ireland, chiefly through the agency of the Presbyterian Church, and where meetings for prayer had been established in many places with a special view to the quickening of professing Christians and the extension of the Redeemer's kingdom. Here also the effects of the movement speedily were manifested in the avidity with which all classes of the population flocked to the services, in open air meetings in social gatherings for devotional exercises, in the general restoration of family worship, in the circulation of the Scriptures, in the multiplication of Sabbath schools, in the enlarged spirit of Christian liberality, and in the diminution of vice and immorality, and especially of drunkenness, the moral improvement produced on the masses of the town and country population being frequently and forcibly adverted to in public by judges and magistrates in proof of the reality and power of the spiritual work. Ulster was visited by many Scotsmen in the early period of the movement, who brought back accounts of what was going on to many in various districts of their own country. In Scotland, also, preparation

had been made by a spirit of prayer and an increased power of spiritual life amongst earnest Christians. Several influential laymen had for some time been actively engaged in various parts of the country in rousing the people to a sense of the necessity of a quickening of divine life in the churches. When the revival commenced its results were nowhere more striking than among the long neglected population of the fishing villages in the east and north, in some of which the whole moral aspect of the people became changed. In Glasgow, Edinburgh, Aberdeen, Perth, Dundee, Paisley, Dumfries, and other large towns and populous villages, the power of the movement was extensively experienced, and everywhere gave rise amongst the different denominations to renewed and active exertions for bringing the neglected poor within the range of evangelistic and educational operations. Meetings for prayer became universal throughout the churches and in the centres of the busy population of commercial towns, and there have in many instances settled down into the established week day prayer meetings of congregations. The Principality of Wales again largely participated in the revival, the increase in the membership of its churches in one year, from June, 1859, amounted to 38,724 in the Calvinistic Methodist body alone, whilst the Independent denomination had an increase from the same cause of 30,000, the increase in the Established Church was about 20,000 in the Wesleyan body about 10,000—making, together with the additions in smaller orthodox bodies, an aggregate of 100,000. Various parts of England shared in the good work, although the same means of estimating its extent and efficacy have not been furnished in a statistical form. The latest, and in some respects perhaps the most extraordinary revival movement of modern times, was that initiated by the two American 'evangelists, Messrs. Moody and Sankey, whose respective functions it has been, to use their own words, 'to preach and to sing the gospel.' The movement commenced in 1873 in England, but it attained no great prominence until the arrival of the two gentlemen in Edinburgh. Their ministrations in that city, and afterwards in Glasgow, Dundee, and other towns in Scotland, and also in England and Ireland, up to August, 1875, were attended daily by multitudes of people eager to hear them. A remarkable feature of these assemblies was the presence in great numbers of the upper ranks of society, even to members of the peerage and royal family. Indeed, if we wished to characterize the movement in one word, we might call it an upper class revival. Numerous clergymen of all denominations, and of high standing in their respective churches, countenanced the work and assisted at the revival meetings. These meetings were throughout conducted in an orderly manner and with a striking absence of any perceptible excitement. They resulted in the professed conversion of thousands. To all appearance these men were instrumental in effecting no small amount of good. On their return to the United States they headed a similar movement there and they paid subsequent visits to Britain in 1883-84 and 1891-92. The Salvation Army relies on revivalist methods. See Porter's *Revival of Religion* (1877), Overton's *Evangelical Revival of the Eighteenth Century* (1886) lives of revival leaders, &c.

REVOCATION in law, the destroying or annulling of a deed or will which had existence till the act of revocation made it void. The revocation of a deed can only be effected when an express stipulation has been made in the deed itself reserving this power. The revocation of a will can be made in four different ways—(1) by another will (2) by intentional burning, or the like, (3) by the disposi-

tion of the property by the testator in his lifetime, (4) by marriage. By the first and third of these modes the will may be revoked either entirely or partially, by the second and last the revocation will be total.

REVOLUTION and INSURRECTION We shall not here go into the question of the great changes wrought in the condition of society by political revolutions, which seem necessary to its progress, but shall confine ourselves to a few remarks on the right of insurrections against established governments. There has been much speculation on the subject, whether citizens, under any circumstances, are allowed to take up arms against established authorities, and if so, under what circumstances, &c. Without being able to enter here into all the arguments on this subject, the question may be briefly considered thus—If governments are instituted merely for the benefit of the people it is clear that, if they have failed to answer their end, and will not submit to such changes as the people consider necessary, the people have the right, nay, are even under obligation, to overturn the existing system by force, on the general principle that all rights may be maintained by force when other means fail. The principle is so evident that it would never have been disputed had it not been for monarchs and their supporters, who dreaded its application. In extreme cases it is admitted by all. None, for instance, would have denied the Arabs in Egypt, or the Berbers in Barbary, the right to rise against what was called their government—a band of cruel and rapacious robbers. But at what point does this right of insurrection begin? This point it is impossible to fix in the abstract. A treatise not confined to narrow limits, like this article, might make a full statement of cases, imaginary or real, and point out what was demanded in each, might hold up to view the evils of a bad government on one side, and of civil war on the other, and endeavour to show under what circumstances it was better to endure the one or to hazard the other. But it could not lay down any general rule but the vague one already given. The character of insurrections, which, while they present some of the brightest and some of the foulest spots in history, always derange the framework of society, is such that they will not, generally speaking, be lightly entered into. Fanatics may sometimes take up arms from slight causes, but, generally speaking, that principle in human nature which leads men to endure the evils of established systems as long as they are endurable, will be a sufficient security against the abuse of the indefinite rule which we have stated. But while we maintain the right of insurrection, under certain circumstances, from the inalienable rights of mankind, we also admit that it can never be lawful in the technical sense of the word, because it is a violation of all rules of positive law. All the rights which a citizen, as such, enjoys emanate from the idea of the state, and the object of an insurrection is the destruction, at least for the time, of that order which lies at the basis of the state, by the substitution of force for law. The right of a citizen, as such, to rebel is a contradiction in terms, as it implies that the state authorizes its own destruction. An insurrection becomes lawful, in the technical sense of the word, only when it has become a revolution, and has established a new order in the place of the old. We speak, of course, of insurrections against established governments. An insurrection to overthrow a usurpation is of a totally different character, as its object is the restoration of the established order, which has been arbitrarily interrupted. While, therefore, the right of insurrection is inherent in man, it can never be rationally

admitted as a principle of any constitution of government, and it was equally unphilosophical and inexpedient for one of the early French constitutions to give the right of opposing by force the exercise of unlawful power, but from the constitution of human society it hardly seems possible to avoid the occurrence of forcible changes in political systems. No thing in this world can last for ever, institutions established centuries ago to answer the demands of a state of things which has long ceased to exist, frequently become extremely oppressive from their inconsistency with the new tendencies which have sprung up in society. Sometimes the evil may be remedied without bloodshed, sometimes happy accidents facilitate a change, at other times, however, the old order of things assumes a tone of decided hostility to the new tendencies, and this is what must be expected in a large proportion of cases. Then it is that revolutions break out and eventually establish a new order, from which new rights and laws emanate. While, therefore, the philosopher and historian acknowledge the necessity, and even obligation, of insurrections they will nevertheless not fail to utter a solemn admonition against resorting rashly to this extreme remedy for violated right. There is a solidity, an authority, a completeness in a political system which has acquired maturity by slow degrees and long struggles that can never be long to any new system suddenly substituted in its stead. There can be no security for permanent liberty till the civic element has become developed, and men have become attached to a given system of social connections. The common principle, therefore, of weighing the evil to be risked against the good to be gained by a political revolution needs to be strongly impressed upon every people in a state of political excitement.

REVOLUTIONARY TRIBUNAL. See ERROR (IGNOR).

REVOLVER, or RELOADING PISTOL, a description of firearm by which, with one barrel and trigger, a number of shots can be fired successively without reloading. It is evident that a person provided with a weapon of this description must possess an immense advantage over an opponent not so armed, and must also have a greater chance of escape in the event of being attacked by numbers. For the introduction of the revolver in its present form we are indebted to Colonel Samuel Colt, of the United States, though repeating pistols have long been known in other countries. These were made from one mass of metal bored into the requisite number of barrels, but were so clumsy as almost to be quite useless. In Colt's revolver as originally made there is a revolving cylinder containing six chambers placed at the base of the barrel, each chamber having at its rear end a nipple for a cap. These chambers contain the cartridges which are put in from the front of the breech piece and driven home by a lever ramrod placed in a socket beneath the barrel. The revolver is fired through the single barrel, the cylinder being turned by mechanism connected with the lock until each chamber in succession is brought round so as to form virtually a continuation of the barrel. Various modifications of Colt's revolver have been introduced by different parties, with the view in some cases of increasing the rapidity and facility of firing, in others of diminishing by safeguards the risks to which in experienced hands must ever be exposed in the use of these weapons. Thus the pistol manufactured by Messrs Deane and Adams can be fired by merely drawing the trigger, while in another form of revolver a spur is placed under the trigger guard, so that the piece can only be discharged by pulling the spur by the middle finger and the trigger by the

forefinger at the same time. Revolvers as they came in possessed a twofold advantage over the pistols previously used—the first, their multiple power of discharge, the second, their receiving their bullets and charges of powder directly into their chambers without the interposition of the rifled barrel. Nevertheless serious objections might be urged against them on the score of the danger and inconvenience attendant on their use. In loading, for example, if caps were not put on the nipples some powder might probably escape through the vents. Yet to cap before forcing home the powder and bullet rendered that process dangerous. If, however, the loading was troublesome the unloading was much more so, hence, revolvers have frequently been left loaded for long periods, and many accidents have happened through them. In modern revolvers, however, such disadvantages are reduced to a minimum, the weapon being loaded and unloaded with great ease, and no cap being required, the explosive or cap being contained in the cartridge itself.

In the Smith and Wesson revolver, an American weapon introduced into the Austrian and Russian services, facility in loading is a feature, the cylinder and barrel together being pivoted to the front of the stock, so that by setting the hammer at half cock, raising a spring catch and lowering the muzzle, the bottom of the cylinder is turned up to receive a fresh supply of metallic cartridges. When this is done the muzzle is pressed back until the snap catch fastens it to the back plate, and the revolver is again ready to be fired. In the latest form of this revolver the empty cartridges are thrown out of the cylinder by means of an automatic discharger. The British regulation army revolver is Wbley's modified Smith and Wesson, which chiefly differs from the original in the method of securing the hinged barrel and revolving chambers to the standing breech and stock of the pistol. The mode adopted permits of very rapid loading, and when fired off the empty cases are automatically ejected. The weapon can also be easily and instantly unloaded, and some are made with a covered hammer and a safety bolt which has to be pressed in before the weapon can be fired, thus rendering it quite safe to handle even by the careless or inexperienced. Any objection that may be urged against carrying cartridges with caps in them, or as it is termed fixed ammunition, is met by the fact that it is almost impossible to fire a single cartridge except by the fair blow of the hammer when it is held in the chamber, and also that the ignition of one cartridge does not fire any others in contact with it.

As a military weapon the revolver may, it is thought, be superseded by a repeating pistol with mechanism similar to that of magazine rifles. The revolver principle has also been applied to rifles and to guns for throwing small projectiles, as in the Gatling and other machine guns. See MACHINE-GUN.

REVUE DES DEUX MONDES, a famous French magazine and critical organ appearing twice a month. Established in 1831 it has had among its contributors the highest names in French literature.

REWAH, a native state and town of Hindustan, protected by the British, in the Central India Agency and in the sub agency of Bhagalkhand, area, 10,000 square miles. It is chiefly an elevated table land, but also comprises portions of the country on both sides of the Kaimor Hills, watered by the Son, a tributary to the Ganges, and flowing north east. The surface is in part covered with jungle, but on the whole highly cultivated, the condition of the peasantry is, however, much depressed. The ruins of many temples are scattered over the country, the forts

which formerly abounded here were destroyed by the British in 1813. The revenue of the maharajah amounts to about £250,000 annually, the armed force consists usually of 4000 men, though from 10,000 to 12,000 might occasionally be mustered. Pop. (1891), 1,508,943. The town lies 131 miles south west of Allahabad is inclosed by a set of three walls or ramparts, the outer one of massive structure, and flanked by round towers. It presents various traces of former splendour, and contains a fortified palace of the maharajah, which however, like many of its buildings, is in decay. Pop. in 1891, 23,626.

REYKJAVIK. See REIKIAVÍK.

REYNARD THE FOX. See REYNARD.

REYNOLDS, SIR JOSHUA, an eminent English painter, was born at Plympton Pools in Devonshire, 16th July, 1723, being the seventh child of the master of the grammar school of that town. He early showed a fondness for the art of drawing which induced his father to place him, at the age of seventeen, with Hudson, the most famous portrait painter in London with whom he remained about three years (1740-43), and then upon some disagreement returned to Devonshire. He passed some time without any determinate plan, and from 1746 to 1749 pursued his profession in Devonshire and London, and acquired numerous friends and patrons. He accompanied Commodore (afterwards Admiral) Keppel in 1749 on a cruise to Lisbon, Cadix, Gibraltar, Algiers and Minorca. He then proceeded to Rome in which capital and other parts of Italy he spent three years. On his return to London he painted a full length portrait of Keppel, which was very much admired and at once placed him at the head of the English portrait painters. Rejecting the stiff unvaried and unimaging attitudes of former artists he gave to his figures an air and action adapted to their characters, and thereby displayed something of the dignity and invention of history. Although he never attained to perfect correctness in the naked figure he has seldom been excelled in the ease and elegance of his faces, and the beauty and adaptation of his fancy draperies. His colouring may be said to be at once his excellence and his defect. Combining in a high degree the qualities of richness, brilliancy and freshness he was often led to try modes which probably from want of a due knowledge in chemistry and the mechanism of colours frequently failed and left his pictures after a while in a faded state. He rapidly acquired opulence, and being universally regarded as at the head of his profession he kept a splendid table which was frequented by the best company in the kingdom in respect to talents, learning and distinction. In 1764 he founded in conjunction with Dr Johnson the famous Literary Club, which numbered amongst its members men in the first rank of literary eminence by whom Reynolds seems to have been universally beloved and respected. He is the favourite character in Goldsmith's poem *Retaliation* and Johnson characterized him as one in abusing whom he should find the most difficulty. On the institution of the Royal Academy in December 1768 he was unanimously elected president and in April 1769, the king conferred upon him the honour of knighthood. Although it was no prescribed part of his duty to read lectures, yet his zeal for the advancement of the fine arts induced him to deliver annual or biennial discourses before the academy on the principles and practice of painting. Of these he pronounced fifteen, from 1769 to 1790 which were published in two sets, and form a standard work. In 1781 and 1783 he made tours in Holland and Flanders, and wrote an account of his journeys, which consists only of notes

of the pictures which he saw, with an elaborate character of Rubens. In 1784 he succeeded Ramsay as portrait painter to the king, and continued to follow his profession, of which he was enthusiastically fond, until he lost the sight of one of his eyes. He however, retained his equal spirits until threatened in 1791 with the loss of his other eye, the apprehension of which, added to his habitual deafness, exceedingly depressed him. He died February 23, 1792, in his seventieth year, unmarried, and was interred in St. Paul's Cathedral. Sir Joshua Reynolds, although there was scarcely a year in which his pencil did not produce some work of the historical kind ranks chiefly in the class of portrait painters. His *Ugolino*, and his *Death of Cardinal Beaufort* are however, deemed, in grandeur of composition and force of expression, among the first performances of the English school. But, on the whole his powers of invention were inadequate to the higher flights of historic painting, although inexhaustible in portrait to which he gave the most delightful variety. His character as a colourist has been already mentioned, and though not a thorough master in drawing he gave much grace to the turn of his figures, and dignity to the air of his heads. As a writer he obtained reputation by his *Discourses*, which are elegant and agreeable compositions, although sometimes vague and inconsistent. He also added notes to Dufresnoy's *Art of Painting* and gave three papers on painting to the *Idler*. The *Literary Works of Sir Joshua Reynolds* were edited by Malone in two volumes quarto, in 1797 with a life of the author. Another edition of his literary works was published in 1835. Among later editions of the *Discourses*, that of 1884 in the *Punchnet Library* may be mentioned. Besides memoirs of his life written by Northcote, Farington, and Phillips— all members of the Royal Academy—we have also *The Life and Times of Sir Joshua Reynolds* by C. R. Lashie, R.A. (1865) and a more recent *Life* by C. Phillips (1891). A memorial window in his honour was placed in 1866, in Plympton church, of which his father had been rector.

RHABDOMANCY (Greek *rhabdos*, a rod and *mantia* divination), the use of what is called the divining rod or the power considered by some as existing in particular individuals partly natural and partly acquired of discovering things hid in the bowels of the earth, especially metals, ores, and bodies of water by a change in their perceptions, being aided in the discovery of these substances by the use of certain instruments. That rhabdromancy, generally speaking is little more than self delusion, or intentional deception, is now the opinion of most investigators. Still, it has some champions and believers even at the present day. The subject indeed has recently been discussed in more than one English periodical and the newspapers have again and again published accounts of water being discovered where none was known to exist before solely by the use of the divining rod or, as it is called in some districts, the 'dowsing rod'. Rhabdromancy was practised in very ancient times and has been well known in Europe from the Middle Ages downward. Agricola, in a treatise on mining published in 1557, speaks of forked hazel wands being regularly used by certain persons as a means of discovering mineral veins in the earth. Towards the end of the seventeenth century Jacques Aymon professed to discover crimes by the divining rod and found many believers. Some have tried to explain the alleged phenomena of rhabdromancy by certain 'magnetic' or 'electrometric' effects. According to Ritter and Amoretti, writing early in the nineteenth century, an acceleration or retardation of the pulse, and a sensation of cold or

heat in different parts of the body, often so great as to affect the thermometer, take place in certain persons when they are in the vicinity of subterranean water or ore, &c., also peculiar sensations of taste, spasmodic contractions of particular parts, convulsions, giddiness, &c. The instruments of rhabdomanancy are known under the names of the *magnetic* or *sideral pendulum*, the *bipolar cylinder*, and the *divining rod*. The magnetic pendulum consists of a small ball, of almost any substance (for example, metal, sulphur, wood, sealing wax, glass, &c.), which is suspended from an untwisted string, such as the human hair, unspun silk, &c. In using this the string of the pendulum is held fast between two fingers, and remains suspended over the sideral substance (as, for example, a plate of metal or a cup filled with water and salt), without motion. If now (say the advocates of rhabdomanancy) the person who holds the pendulum possesses in any degree the magnetic susceptibility (the rhabdomatic quality), the pendulum will move in a circular orbit, with some differences according to circumstances. These circumstances are the substance of the pendulum and of the objects under it, the distance of the pendulum from these objects, and the nature of the person who holds the pendulum, and of those who come in contact with him, &c. The principal difference of the motion of the pendulum is that it moves in some cases from left to right, that is, with the sun, in others from right to left or against the sun. That the mechanical motion of the fingers does not produce the vibration of the pendulum, at least in many cases, appears from accurate observation of many experiments of this kind, and this circumstance is, moreover, remarkable, that the vibrations do not ensue unless the hand of a living person comes in immediate contact with the string. The bipolar cylinder consists of a body having two poles, and easily moved, as for instance a magnetic needle, or a cylindrical bar of two different metals, any light cylindrical body such as a quill with the feathers on, will serve. The diviner holds the cylinder in a perpendicular direction, between his thumb and fore finger, while with his other hand he touches some magnetic body, as for instance, a metal. Under these circumstances a slow revolving motion of the cylinder takes place between the fingers, which likewise, as in the case of the pendulum, sometimes moves in a forward and sometimes in a retrograde direction, according to circumstances. The divining rod is a rod with a forked end, generally of hazel, but sometimes of brass, copper, or iron. The rod is held suspended from the hand by the two prongs. If the person who holds the rod possesses the powers of rhabdomanancy, and touches the metallic or any other magnetic substance, or comes near them, a slow, rotatory motion of the rod ensues in different directions, according to particular circumstances, and, as in the other cases, no motion takes place without a direct or indirect contact with a living person. In the south of France and in Switzerland this art is frequently made use of under the name of *metalloscopy* (the art of seeing, or discovering metals), and of *hydrosopy* (the art of seeing or discovering water). In the practice of this art the direction, duration, and other circumstances of the motion of the instruments, determine the quality, quantity, distance and situation of the subterranean substances, or the different sensations of different rhabdomanants are taken into account.

RHADAMANTHUS, a son of Zeus and Europa, and brother of Minos, the first lawgiver of Crete and the Grecian world. According to another tradition Rhadamanthus himself laid the foundation of the Cretan code of laws, which his brother Minos only completed. From fear of his brother he is said to have fled to Ocalia in Bœotia, where he married

Alcmene. Rhadamanthus, after his death, became one of the three judges who administered justice to the dead at the entrance of the kingdom of spirits, near the throne of Pluto, continuing the occupation in which he had spent his earthly existence, for it was then the common opinion of the Greeks that the spirit, which arrived in the dark kingdom of Tartarus, strove to continue the business of life. The whole notion of Tartarus, however, in this view, was rather a philosophical allegory than a true myth.

RHETIA, a Roman province south of the Danube, including the two countries of Rhetia Proper and Vindelicia, which were afterwards separated under the names of *Rhetia Prima* and *Rhetia Secunda*. The former, or Rhetia Proper (*Rhetia Propria*), extended from the Rhine to the Norican Alps, and from Cisalpine Gaul to the borders of Vindelicia. It contained the rivers Rhine (*Rhenus*), Inn (*Alnus*), Adige (*Adriens*), and many smaller ones, and included the modern Vorarlberg and Tyrol with a part of the country of the Grisons. The original inhabitants of the country are considered by most ancient writers to have been Etruscans, who had been driven out of Italy by the invasion of the Gauls, and who, under their leader Rhatius, took possession of this mountainous region. Justin, Pliny, and Stephen the Byzantine, therefore, called the Rhetians an Etruscan race. (See **ETRURIA**.) The Romans planted colonies here as in the other provinces, among which Tridentum (*Trent*), Bellunum (*Belluno*), Bauzanum (*Bolzano*), Bilitio (*Bellinzona*), Clavenna (*Chiavenna*), and Curia (*Cure*), were the principal. Several of these cities, however, were only indebted to the Romans for their extension and embellishment. The Rhetians were a brave and warlike people, and repeatedly laid waste the Roman territories, in conjunction with the Gauls. In order to put a stop to their marauding incursions Augustus sent his step-son Drusus against them. They offered a brave and desperate resistance, but Drusus succeeded in defeating them (16 B.C.) near Trent, but as this victory was not decisive, he undertook with his brother Tiberius a second campaign, in which Tiberius attacked the Vindelici from Lake Constance, while Drusus advanced against the Rhetians by land. In this expedition the Romans were victorious, and both countries were made Roman provinces. Rhetia Transalubiana, the country on the left bank of the Danube, was well known to the Romans, but never conquered by them. After the fall of the Roman power the Alemanni and Suevi occupied these provinces.

RHETIAN ALPS. See **ALPS**.

RHAMMAN. See **RAMADAN**.

RHAMNACEÆ, a natural order of exogenous plants, consisting of trees or shrubs, with simple, alternate, rarely opposite leaves, usually furnished with stipules. The flowers are small, and usually of a greenish yellow. Petals four to five, distinct, cucullate or convolute, rarely wanting, alternating, with the lobes of the calyx, and all inserted in the mouth of the calyx. The calyx is monospalous, four to five cleft, with the tube adhering to the base of the ovary, lobes valvate when in the bud. Stamens opposite the petals, which they equal in number, anthers two celled, ovary free, or adhering more or less to the calyx, styles one to three, stigmas two to three. The fruit is fleshy, and does not open when ripe, or dry and separating into three parts. This order contains about 250 known species, distributed very generally over the globe. There is a remarkable agreement throughout the order between the inner bark and the fruit, especially in several species of *Rhamnus*, in which they are both purgative and emetic, and in some degree astringent. Many species,

however, bear wholesome fruit, and the berries of most of them are used for dyes (See FRENCH BERRIES) The buckthorn, jujube, and lotus belong to this order See those articles.

RHAPSODISTS (from the Greek *rhaps*, to string together, and *odê*, a song) were the wandering minstrels among the ancient Greeks, who sang the poems of Homer (these were also called *Homeridae*) and those of other poets They were for a long time held in high esteem, until the poems were committed to writing, and through the medium of manuscript copies became pretty generally known, when the rhapsodists soon lost their importance Each ballad or recitation was termed a *rhapsody*, and thence it was applied to the separate books of the Iliad and Odyssey, in this usage corresponding to our word *canto* At present we understand by rhapsody a series of sentences or statements strung together with no proper connection

RHATANY See **RATTANY**

RHE See **Rf**

RHEA, one of the most distinguished of the Titanides (see **TITAN**), was the sister and wife of Cronos (Saturn), and with him a symbol of the first creation Rhea, the Flowing (from *rhein*, to flow), is the symbol of the struggle between chaos and order The former is yet superior, by the side of Rhea is Cronos, jealous of the new forms, and annihilating them at the moment of their creation—the symbol of all devouring time She gave birth to three sons and three daughters—Hestia (Vesta), Demeter (Ceres), Hera (Juno), Hades (Pluto), Poseidon (Neptune), and Zeus (Jupiter)—whom their father, Cronos, successively devoured, all except the last In order to save Zeus she retired to Crete by the advice of her parents, Uranus and Gaia, and when her infant was born she gave to Cronos a stone wrapped up, which he swallowed, supposing it to be his child In order that the cries of the infant might not reach Cronos, Rhea's servants, the Curetes, kept up a continual noise in the neighbourhood, by dancing and clashing together their swords and shields As the preserver of the future sovereign of gods and men she was the symbol of the productive power of nature, the preserving and life-giving principle of the world Her attributes, as the tamer of lions, which are harnessed to her chariot, and as the companion of Bacchus, and her crown of turrets, point to the same symbol Her worship was attended with the greatest excesses of licentiousness and cruelty The great centre of her worship under her name of Cybele, was at Pessinus in Phrygia, whence it spread to Sardis, Smyrna, Ephesus, thence to Athens and other places

RHEA A name given in India to the plant known as the *Boehmeria nuxa* (See **BOEHMERIA**) The fibre of this plant is exceedingly strong, being said to be about $2\frac{1}{2}$ times stronger than the best Russian hemp It also possesses unusual beauty, the fabrics made from it having the durability of linen with, when wanted, the glossiness of silk The plant is widely distributed, and can be successfully cultivated in France, England, or the United States Notwithstanding its valuable qualities, rhea fibre has not yet gained that importance in textile manufactures which it seems to merit so well The reason of this appears to be its comparative coarseness (three times that of jute), which is owing to the great amount of labour required in getting the bark, gum, &c., separated from the fibre Since 1880, however, various machines and improved processes have been invented for cleaning it, which have considerably reduced its price, so that there is now the prospect of a great future for this strong and beautiful material

RHEA See **OSTRICH**

RHEIMS, or **REIMS**, a town of France, in the

department of Marne, in an extensive basin, surrounded by slopes covered with vineyards, 82 miles E.N.E. of Paris, on the right bank of the Vesle, and on the Aisne and Marne Canal The streets are spacious and regular, and several of the squares are large and handsome Since the Franco-German war it has been surrounded by detached forts, which make it a place of great strength The principal edifices are the cathedral, one of the finest Gothic structures of the thirteenth century now existing in Europe, 466 feet long and 121 feet high, surmounted by two massive towers, and specially remarkable for its western façade with the three portals, great rose-window, and numerous statues that adorn it, the church of St Remy, partly Romanesque, partly Gothic, the oldest, and still, with exception of the cathedral, the finest church in Rheims, the archiepiscopal palace (1498–1504), occupied by the French kings on the occasion of their coronation, the Porte de Mars, one of the gates originally built by the Romans as a triumphal arch in honour of Cæsar and Augustus, and repaired so as to have again become, after great dilapidation, a truly splendid structure, the town house, with an elegant façade of modern construction, and containing a museum of natural history and a library of 60,000 vols., and several ancient mansions, particularly the hotel of the counts of Champagne, furnishing fine specimens of picturesque street architecture The most important industries of Rheims are the spinning and weaving of woollens, especially merinoes, cashmeres, flannels, and blankets It is also a great centre of the champagne trade, the vast cellars in which the wine is stored, and which are hewn in the limestone rock, being among the sights of the city There are also numerous dye works, worsted mills, breweries, and tanneries The trade is important Rheims is the see of an archbishop, and possesses a lyceum, school of medicine and pharmacy, society of arts and sciences, &c

Rheims is a place of great antiquity Even before the Roman invasion it had acquired some importance, when it was known by the name of *Durocortorum* At a later period it became the principal town of Belgic Gaul, and was adorned by numerous handsome edifices Christianity is said to have been introduced into it in 360, and its cathedral to have been founded about 400 by St Nicasius, who perished shortly after in a massacre by the Vandals, who had made themselves masters of the town St Remy, one of his successors, converted and baptised Clovis and almost all the Frankish chiefs in 496, after the battle of Tolbiac Philip Augustus caused himself to be consecrated at Rheims in 1179, and the example was afterwards followed by his successors, with the exception of Henry IV, till the time of Napoleon I Rheims often suffered much from war, and was repeatedly in possession of the English, who were finally expelled by the Maid of Orleans in 1421 In 1814 the Russians gained possession of the town, but were shortly after surprised and driven out by Napoleon, whose success on this occasion was the last which he was destined to enjoy Pop in 1891, 104,186, in 1901, 107,773

RHEINGAU, a territory in the southern part of the Duchy of Nassau, extending along the right bank of the Rhine for about 15 miles, between Biebrich and Rudesheim, in the bailiwicks of Wiesbaden, Eltville, and Rudesheim It is equally distinguished by its beauty and fertility, produces excellent wine and fruit, and maintains a very dense population

RHENISH CONFEDERATION See **CONFEDERATION OF THE RHINE**

RHENISH PRUSSIA See **RHINE (PROVINCE OF THE)**

RHENISH WINES, the general designation for the wines produced in the region watered by the

Rhine, they are the finest wines of Germany. The vines on the Rhine were planted in the third century, under the Emperor Probus. According to a still existing tradition, Charlemagne transplanted the first vine in the Rheingau from Orleans. The Rheingau is the true country of the Rhenish wines. The best are those of Assmannshausen (chiefly red), Rudesheim, Hinterhausen, Geisenheim, Johannisberg, the best of all, and Markobrunn. Besides the wines of the Rheingau, the following are good Rhenish wines on the left bank, those of Niekenstein, Liebfraumilch, a mild wine growing near Worms, Laubenheim, Bacharach, on the right bank, Hochheim (whence English Hock). Among these wines the Laubenheim and Assmannshausen are the most agreeable, the Hochheim, Johannisberg and Geisenheim the most aromatic, the Niekenstein, Markobrunn, Bacharach, and Rudesheim the strongest and most fiery. Rhenish wines improve much with age and continue improving longer than any other wines. Some of the wine cellars of Germany are said to contain Rhenish wine above 200 years old.

RHEOSTAT, an instrument invented by Wheatstone for measuring electrical resistances. Two rollers, A and B, the latter non-conducting, the former of brass are geared together so that when either is turned by means of a handle a fine copper wire will be uncoiled from one roller as it is wound upon the other. An index shows the number of coils on B at any time. Two binding screws, one of them in contact with the brass cylinder and the other with the end of the wire on the non-conducting cylinder connect the apparatus with the wires of the battery. To use the rheostat the resistance to be measured is put in circuit with a constant battery and a galvanometer and the indication of the galvanometer is noted. The resistance is then removed from the circuit and the rheostat is put in its place, and the handle turned till the galvanometer gives the same reading as before. The resistance of the rheostat is now the same as the resistance which was to be measured and it is measured by the number of coils of copper wire on the insulating roller B.

RHESUS MONKEY (*Macacus rhesus*), or BENGAL MONKEY, a well-known East Indian species of monkey of the family Cercopithecidae, known to the Hindus as *bhandar*. It is a strong species with powerful limbs, but without the tuft or beard found in some allied species. The body attains a length of about 2 feet and the tail is of medium length. Brown is the prevailing colour, but the bare face and the callosities are flesh coloured or red. The rhesus monkey is very intelligent and mischievous, and the young ones can be easily tamed. In several parts of India the Hindus protect this species for which they have a great veneration.

RHETORIC (Greek, *rhētorikē* from *rhētor*, an orator), in its widest sense, may be regarded as the theory of eloquence, whether spoken or written, and treats of the general rules of prose style, in view of the end to be served by the composition. Speech is addressed to the understanding, the will, and the taste; it treats of the true, the beautiful and the good, and is therefore didactic, critical, and pathetic or practical. These different objects are often united in the same work, which therefore partakes of all the three characters above mentioned, but at the same time one or the other character so far prevails as to give a predominant temper to the whole. In a narrower sense rhetoric is the art of persuasive speaking, or the art of the orator, which teaches the composition and delivery of discourses intended to move the feelings or sway the will of others. These productions of the rhetorical art are designed to be

pronounced in the presence of hearers with appropriate gesture and declamation and they often therefore require a different style of composition and arrangement from those works which are intended simply to be read and not oratorically declaimed and which are embraced in the jurisdiction of rhetoric in its widest sense. The Romans distinguished three kinds of eloquence—the demonstrative, occupied with praise or blame and addressed to the judgment, the deliberative which acts upon the will and the inclinations by persuasion or dissuasion, and the judicial or forensic which is used in defending or attacking. The Greeks divided discourses according to their contents as relating to precepts (*logoi*), manners (*ethē*), and feelings (*pathē*), and as therefore calculated to instruct to please, and to move—a division easily reconcilable with the former. The Romans had also a corresponding division into the *genus dicendi tenue medicore* and *sublime*. Modern eloquence has been distinguished, according to the subject to which it relates, into that of the senate, the bar, the pulpit, and the platform. In the wider sense as above explained, rhetoric treats of prose composition in general, whether in the form of historical works, philosophical dissertations, practical precepts, dialogues, or letters, and therefore includes the consideration of all the qualities of prose composition, purity of style, structure of sentences, figures of speech, &c., in short of whatever relates to clearness, preciseness, elegance and strength of expression. In the narrower sense of rhetoric as the art of persuasive speaking it treats of the invention and disposition of the matter. The latter includes the arrangement of the parts which are the exordium or introduction, narration (when necessary), proposition and division, proof or refutation and conclusion or peroration, and the diction which relates to the style and requires elegance, purity, and precision. The delivery or pronunciation also falls here. Aristotle, Cicero, and Quintilian are the principal writers on rhetoric among the ancients, and the most valuable English works on this subject are Campbell's *Philosophy of Rhetoric*, Blair's *Lectures on Rhetoric*, and the treatises of Whately, Spalding, Bain, &c.

RHEUMATISM, a disease which is usually caused by exposure to cold and wet, and is thus related to climate, season and weather. One attack predisposes to subsequent attacks, so that a person who has once suffered from rheumatism is exceedingly liable to a recurrence on exposure to chill or damp. It is also a disease with a marked tendency to hereditary transmission. In its acute form rheumatism presents marked symptoms, the chief of which may be said to be fever, severe joint pains, and profuse sour sweats. In this form it constitutes *acute rheumatic fever*. In some cases the disease attacks with great suddenness, within a few hours after exposure to wet or a chill the person becomes fevered, and complains of aching pains, specially in the joints, and the disease develops with rapidity. In other cases the person may suffer for a few days from symptoms of an ordinary febrile cold, and the specially rheumatic symptoms gradually rise. But its fully developed symptoms are as follows. There is a varying degree of fever, sometimes very high. The pains are severe, sometimes so severe that the slightest movement is unbearable. It chiefly attacks the larger joints, knee, shoulder, elbow, wrist, ankle. Beginning in one joint it passes to others, so that one is often just recovering when another is attacked. The joint is swollen, tender, red, and hot, and suppuration is a rare occurrence. When the inflammation subsides the joint is left with a feeling of soreness and stiffness. The skin is covered with

a sour smelling perspiration, which is very profuse. When the severe attacks on the joints have ceased the muscles and their tendons often are the seat of aching sensations and feelings of cramp. An attack, if untreated, may last from two weeks to six weeks or longer, and relapses are not uncommon, and chronic affections of the joints may remain. In the course of the attack complications frequently arise, of which the most serious is an inflammatory affection of the membrane surrounding the heart or of the valves of the heart. In fact, rheumatic fever is one of the common causes of valve disease of the heart. Lung and kidney complications are also frequent. Short of this severe form rheumatism may occur in a great variety of degrees, few joints being attacked, or only slightly, and with little if any, obvious general disturbance. Specially in persons who have had one attack is a slight exposure to cold or damp, or a mere change in weather likely to occasion joint pains. Slighter degrees of rheumatism may also attack chiefly soft parts: muscles, tendons, and nerves, and thus there may be muscular rheumatism, tendinous rheumatism, rheumatic neuralgia, &c. In an acute attack a patient requires light easily digested food, specially milk food, butchers meat being forbidden and the best drink is soda water or that with milk. The most generally successful medicinal treatment is with salicylate of soda given in 20 grain doses in water every two hours till the pains are relieved and the fever abates, and thereafter four times daily for several days. If this treatment fails, acetate of potash should be given in 30 grain doses every three or four hours. The patient should be clothed in woollen material, and should carefully avoid damp.

RHIGAS, CONSTANTINE, the Tyrtæus of modern Greece, the first mover of the war for Grecian independence, was born about 1753 at Velestino (the ancient Phocæ), a small town of Thessaly. He wrote not only in Greek but also in French, and was a poet and a proficient in music. He formed the bold plan of freeing Greece from the Ottoman Porte by means of a great secret association (the Hetaïræi) and succeeded even in bringing powerful Turks into his conspiracy among others the celebrated Passa in Oglou. He then went to Vienna where many rich merchants and some learned men of his nation resided. From this place he kept up a secret correspondence with the most important confederates in Greece and in other parts of Europe. At the same time he composed in his native language a number of patriotic songs calculated to inflame the imagination of the Greek youth and to embitter them against the Mussulmans. He perished at the age of forty-five. Having been arrested in Trieste he was with several other prisoners conducted to Vienna. Rhigas and three others of those arrested were sent back in chains to Belgrade in May 1798, and were put to death by the Turkish authorities. The influence of Rhigas survived his death. During the Greek war of independence, which ultimately led to the emancipation of their country from the Turkish yoke, his songs were in the mouth of everyone. The most celebrated of them are his translation and adaptation of the *Marseillaise*.

RHIN, Bas (Lower Rhine), a former department of France, in the east of the country, and lying on the Rhine, below Haut Rhin with an area of 1755 square miles, and a population in 1866 of 588,970. It now forms part of the German imperial territory of Alsace Lorraine corresponding pretty closely with the government of *Niederrhein* (Lower Alsace).

RHIN HAUT (Upper Rhine), formerly a department of France, bounded on the north by Bas Rhin, and on the east by the Rhine, area, 1586 square miles,

pop. in 1866, 530,285, capital, Strasbourg. With the exception of Belfort and a small district round that fortress it now forms part of the German imperial territory of Alsace Lorraine, corresponding closely with the government of Oberelass (Upper Alsace).

RHINE (Latin, *Rhenus*, French, *Rhin*, German, *Rhein*, Dutch, *Rijn*, Italian *Reno*) the finest river of Germany is also one of the most important rivers of Europe, as its direct course is 460 miles long and its indirect course about 800 miles, the area of its basin is about 86,600 square miles. It is formed in the Swiss canton Grisons by three main streams called the Vorder Mittel and Hinter Rhein, or the Upper, Middle and Lower Rhine. The Vorder Rhein rises in the small Toma Lake (7690 feet high) lying to the north east of the St. Gothard, and is augmented by two streams which unite with it near Churru (7380 feet). The Mittel Rhein issues from a small lake west of the Lukmanierberg, traverses the Medelsertal and joins the Vorder Rhein at Disentis from which point the united stream is called Vorder Rhein. It takes an easterly direction and at Reichenau unites with the Hinter Rhein, which issues from the Rheinwald Glacier, in the Adula group, and has a course of about 70 miles through the Rheinwaldthal before reaching Reichenau. Here the stream takes the name of Rhine, has a width of 130 to 140 feet and admits of floating. The Rhine first becomes properly navigable at Cone after receiving the Plessur. It now turns north, and shortly after being augmented by the Landquart quits the Grisons forms the boundary between the canton of St. Gall on the left and Lucerne and Vorarlberg, on the right, receiving the Ill from the latter and enters the Bodensee or Lake of Constance continued by the Untersee. On issuing from the Untersee it flows west, separating Switzerland from the Grand duchy of Baden and continues its course to Schaffhausen and Basel, receiving as it proceeds on the left the Goldach, Thur, Thoss, Glatt and Aar and on the right the Wutach and Alb mountain streams of the Black Forest. At Schaffhausen the river forms perhaps the grandest waterfalls in Europe. At Basel it again begins to flow north when it separates the German territory of Alsace from Baden forms the boundary between the latter and the Bavarian Palatinate, flows thereafter through the Grand duchy of Hesse, forms the boundary first between it and Nassau, and then between Nassau and the Prussian Rhinish province, till it wholly enters the latter at Coblenz. During the course from Basel now described it receives on the left the Ill and several little streams from the Vosges and the Lauter and Quich, and on the right the Wies, Elz, Kinzig, Murg, Pfalz, Neckar, Main and Lahn, and passes Briesach, Strassburg, Germersheim, Speyer, Mannheim, Worms, Mainz, Biberich, and Bingen. In Rhinish Prussia it receives on the right the Wied Sieg, Wupper, Ruhr, and Lippe, and on the left the Nahe, Moselle, Ahr, and Riff, and flows past the towns of Neuwied, Bonn, Cologne, Düsseldorf and Wesel. Thereafter below Emmerich it enters the Dutch province of Gelderland, and shortly after divides into two branches, a south and a north. The south, called the Waal (anciently Vahalis), carries off two thirds of its water, and joins the Maas or Meuse at Woudrichem. The north branch, after making several windings in its course to Arnhem, but still retaining the name of Rhine (Rijn), divides at Westervoort before reaching Arnhem, into two branches. Of these the right proceeds as the New IJssel, in the bed of the canal which Drusus dug to connect the Rhine with the Old IJssel, till it reaches Doesburg, where the New and Old IJssel unite to

pour their accumulated waters into the Zuyder Zee. The left arm proceeds, under the name of Rhine, in a course nearly parallel to the Waal, passing Wagnen and Rhenen to Wijk-by-Dursted, where it again bifurcates, sending a very feeble branch, under the name of the Crooked Rhine, to Utrecht, where, by the canal of Vaart, it communicates with the much larger branch, called the Leck, and flowing past Vianen and Schoonhoven unites with the Maas above Grimpen op de Lek. The Crooked Rhine becomes little better than a ditch on leaving Utrecht it proceeds towards Leyden, and at the beginning of the nineteenth century was lost in the sand beyond Katwijk aan den Rijn. At an earlier period it had here found an outlet into the ocean, and in more recent times, after surmounting many difficulties, the lost water of the Rhine has been collected in a canal, and by the aid of three sluices the outlet has again been established. The breadth of the Rhine and the character of its channel differ much at different parts of its long course. Its breadth at Basel is 750 feet between Strassburg and Spire from 1000 to 1200 feet, at Mainz 1000 to 1700 feet and at Schenkenschanz, where it enters the Netherlands 2150 feet. Its depth varies from 5 to 28 feet, and at Düsseldorf amounts even to 50 feet. From the Lake of Constance to Basel it has a very rocky bed, but lower down contains numerous islands partly composed of sand and clay. From Breisach several of the islands are clothed with herbage, and even admit of cultivation, between Strassburg and Germersheim they form thickets of brushwood. The Rhine abounds with fish, including salmon and salmon trout, but more especially sturgeon, lampreys, pike and carp. Wild fowl also abound in its banks and countless islands. Some gold is contained among the sands brought down into it from the mountains of Switzerland and of the Black Forest.

The navigation of the Rhine is very important, particularly for West Germany. As already mentioned, it first becomes navigable at Coblence in the Rhinons, but the continuous navigation does not begin till below Schaffhausen, and the traffic in loaded vessels is not important above Spire. The navigation is rendered dangerous by waterfalls, more especially those of Schaffhausen, of Zurzach (near the mouth of the Wutach), of Laufenburg, and of Rheinfelden. It is also rendered dangerous by the Bingerloch, near Bingen, where the stream becomes suddenly narrowed and confined between lofty precipices, and by similar causes, though in a less degree, at Bacharach, St. Goar, and at Lurzel.

The Rhine is distinguished alike by the beauty of its scenery and the rich fields and vineyards which clothe its banks. Hence no river in Germany, more especially since the introduction of steam vessels, attracts so many tourists. From Basel to Mainz it flows through a wide valley, bounded on the left by the Vosges, and on the right by the Black Forest and the mountains along the Bergstrasse. From Mainz the mountain ridges approach the stream at first only on the right bank, where they form the Rheingau, but at Bingen they begin to hem in the left bank also, and continue from thence to Konigs winter to present a succession of lofty mountain summits, bold precipices, and wild romantic views. Pleasant towns and villages lie nestled at the foot of lofty hills, above them on all sides rise rocky steep slopes clothed with vines, and every now and then the castles and fastnesses of feudal times are seen frowning from precipices apparently inaccessible. At times the chain of ridges on either side opens out, and allows the eye to wander into romantic valleys, along which tributaries of less or greater magnitude keep dashing down or gradually winding to

the parent stream. On the river itself much additional variety and beauty are given to the scenery by the constant recurrence of picturesque and verdant islands.

RHINE CONFEDERATION. See CONFEDERATION OF THE RHINE.

RHINE PROVINCE OF THE OR RHEINISH PRUSSIA (German *Rheinprovinz*) a province of Prussia, between the imperial territory of Alsace-Lorraine, Belgium, Holland, Luxembourg, Hesse, Hesse-Nassau, the Bavarian Palatinate, and the province of Westphalia, area 10,415 square miles. In the south it is fully being traversed by the ranges of Hohe Auen, Eiffel, Hochwald, Elz, and Hunsrück. It is watered by the Rhine, the Moselle, and some affluents of the Meuse. The proportion of unproductive land is very small. Grain, potatoes, flax, hemp, tobacco, hops, oil seeds, grapes, and other fruits are cultivated, and horned cattle, horses, sheep, goats, and swine are extensively reared. It is the most important mineral district in the kingdom, iron, copper, lead, coal, zinc, gypsum, clay, marble, alabaster, and porphyry being wrought. It is likewise a most active manufacturing district, there being numerous iron works and machine shops, chemical works, sugar refineries, glass works, porcelain works, cotton, wool, linen, and silk spinning and weaving factories, and paper, oil, flax, grain, and other mills, with above 2000 breweries and above 3000 distilleries. It is divided into the five governments (Regierungsbezirke) of Cologne, Düsseldorf, Aachen, Trier, and Coblenz. Pop. (1895) 5,106,002, (1900) 5,759,798, of whom about a fourth are Protestants, three-fourths Roman Catholics, and the rest principally Jews.

RHINE WINE. See RHEINISH WINES.

RHINOCEROS, a genus of Ungulate or Hoofed Mammalia, included in the family *Rhinocerotidae*, of the Ungulate division *Perissodactyla* (which see). This genus includes several well marked species, and the characters of the family are found in the rounded blunt muzzle, in the absence of canine teeth, and in the presence of incisors in both jaws. The molars number seven on each side of each jaw, and possess tuberculate crowns. The skull is of pyramidal form, and the nasal bones are very prominently developed, and support one or more 'horns', which, however, are unpaired or median in their position. The feet possess three toes each, the toes being encased in hoofs. These animals are all of large size and ungainly form, and the skin is usually thrown into folds of more or less definite kind. The Rhinoceros has been generally supposed to represent the fabled 'unicorn' of the ancients, this supposition arising from the fact of these animals possessing nasal horns, which fancy and superstition would readily alter into the more elegant appearance of the unicorn's horn, and at the same time invest the body of the Rhinoceros with the more comely proportions of the mythical animal. The horns of the Rhinoceros consist each of longitudinal united fibres, these structures being of epidermic origin, and presenting the homology of a group of largely developed and modified hairs. When two horns are developed, the hinder one is borne by the frontal bones, and is situated in the middle line behind the front horn. The front horn is generally much larger than the hinder one, the latter, when larger, possessing a different shape from the front structure. These animals feed chiefly upon grasses and the foliage of trees, and inhabit marshy places. In the present day they are confined to tropical climates, and occur in Africa and Asia and the larger islands of the Indian or Malayan archipelago, although, as will be presently noted, their geological or past distribution was of a much more extensive character.

The most familiar species is the typical One horned or Indian Rhinoceros (*Rhinoceros unicornis* or *Indicus*, shown on plate at UNGULATA), which, like all the Asiatic species, has the skin thrown into very definite folds, corresponding to the regions of the body. The horn of this species is black, and usually very thick. Its average length is about 5 or 6 feet, its colour a deep brownish black, tinged with a purplish hue, but the colour in the young animal is said to be much paler than that of the adult. The upper lip is very large, and overhangs the lower. It is furnished with strong muscles, and is employed by the animal somewhat as the elephant uses his trunk. The ears are large, erect, and pointed. The skin is naked, rough, and extremely thick, about the neck it is gathered into large folds, a fold also extends between the shoulders and fore legs, and another from the hinder part of the back to the thighs. The tail is slender, flat at the end, and furnished at the sides with very stiff black hairs. The legs are very short. This animal was well known to the ancients, and was introduced into the games of the circus by Pompey. From the time of the fall of the Roman Empire, however, it was lost sight of so completely, that, prior to the sixteenth century, naturalists were of opinion that it had never existed, or, if so, that it was extinct. When the Portuguese, however, doubled the Cape of Good Hope, and opened the way to India, these animals again became known, and many were introduced into Europe. The first that appeared in England was in 1684. The Rhinoceros lives in shady forests adjoining rivers, or in the swampy jungles with which its native country abounds. Though possessed of great strength, and more than a match for either the tiger or the elephant, it is quiet and inoffensive unless provoked. The female produces one at a birth. The growth of the young is very gradual, as, at the age of two years, it scarcely attains half its height. The sight of the Rhinoceros is by no means acute, but, on the contrary, its senses of smelling and hearing are very keen. Its chief food is canes and shrubs. It was for a long time supposed that the tongue was hard and exceedingly rough, but recent observations have shown that it does not present these peculiarities. The flesh somewhat resembles pork in taste, though of a stronger flavour and coarser grain.

Very many fables were formerly in vogue concerning this animal and its horn, the latter structure being alleged to be capable of detecting poison, which efferevenced when thrown upon it, a presumed quality which caused it to be highly valued by eastern potentates. The habit these animals have of rolling in the mud of their marshes, is apparently calculated to protect them from the attack of mosquitos and other insects which infest the soft tender parts beneath the folds of the skin.

The Javanese or Soudar Rhinoceros (*R. Soudaicus*) is distinguished from the Indian species by its smaller size, and by differences in the disposition of the skin folds. It appears to be chiefly nocturnal in its habits, and has been trained to bear a saddle and to be driven. The horn is also shorter than in the Indian species, and the tail is terminated by curious lateral fringes of hair. The legs are longer, and proportionally more slender than in the Indian Rhinoceros. This form occurs in Java, Sumatra, and Borneo. The Sumatran species (*R. Sumatrensis*) is also found in Sumatra and in the Malay Peninsula. In this form the skin-folds are not at all well marked, and two horns are developed, the first of these being the longer and sharper. The hide is of black colour, and covered by a thin coating of bristly hairs. The neck is short and heavy and the limbs stunted. The head is much elongated, and the

animal is said to be of a very mild temperament, even approaching to timidity.

The typical African Rhinoceros, Rhinaster or Bo-rele (*R. bicornis*), found in Cape Colony and Southern Africa generally, is the best known of the African species. This form, like other African species, possesses no skin folds. The horns are of very characteristic conformation, the front horn being broad and raised as on a base, sharp pointed, and curved slightly backwards, whilst the hinder horn is short and conical. The head is rounded. This animal appears to be of ferocious disposition, and is quick and active, and greatly feared by the natives. The food consists of roots, which it digs out of the earth by aid of its horn. The Keitloa or Sloan's Rhinoceros (*R. Keitloa*), an allied African species, possesses the two horns of nearly equal length, the hinder being elevated above the front one. This form is also avoided on account of its morose temper. The upper lip is specially pendent. The Common White Rhinoceros or Mohogu (*R. or Ceratotherium Simus*) of Africa, is larger than either of the preceding species, and its front horn, when fully grown, may attain a length of 3 feet, the second being short and of conical form. The colour is a dirty white. The muzzle is square and the head elongated. This species is of quiet docile temperament. Its flesh is savoury and the hide is very thick. The Kobaoba or Long horned White Rhinoceros (*R. or C. Onwelli*) is of much rarer occurrence than any of the preceding African species. It is found in the interior, and generally to the east of the Limpopo River. The front horn in this species is nearly straight, and inclines forwards, so as to bring its tip near to the ground when the animal charges or runs. The side of the horn is thus frequently rubbed by contact with the earth. This long horn may attain a length of 3½ or 4 feet, and straight ramrods are made from it. In the White Rhinoceros the upper lip is non prehensile, and in the African species generally no lower incisor teeth are developed.

The Rhinocerotidae form a group of great interest to the palæontologist, there being numerous fossil and extinct species first found in the Miocene formations, and ranging through the succeeding rocks of the tertiary period of geology. The group in which the nostrils were separated by a bony partition or cloison, and in which incisor teeth were wanting in the adult, is represented by the *R. tichorhinus* or Woolly Rhinoceros, a form which was essentially northern in its distribution, and which possessed two horns, but no skin foldings. Its remains do not occur in America, but are found in England and throughout Europe. It was essentially a post glacial mammal, and in time preceded the Mammoth (which see). Its remains first appear in the lowest brick earths of the Thames valley—these deposits being pre glacial, but of later age than those in which the Mammoth remains first occur. The Woolly Rhinoceros remains are also found in Quaternary cave deposits, and in valley-gravels. The limbs of this form were of very robust make. In other fossil species of Rhinoceros—such as in *R. Megalhinus* of the Pliocene beds of Italy and France, and of the Cromer forest bed and lower Thames brick earths of England—no bony partition existed between the nostrils, and the incisor teeth were of moderate size. In *R. incinus* also no cloison existed, and large incisors were present, remains of this form—*Acerotherium* of some authors—occurring in Miocene formations. An imperfect bony nasal partition existed in the *R. Etruscus* and *R. hemitachius* or *leptorhinus* (Owen). The former possessed two horns, its remains being found in Pliocene and Post Pliocene formations. The latter was also bicorn, had no canine or incisor teeth, and occurs in Post

Pliocene deposits—such as the Thames brick earths and cave deposits. The typical genus *Acerotherium* was formed to include hornless Rhinoceroses of Miocene age, and the members of this genus have the feet four toed, but the *R. incisivus* of Cuvier, already mentioned, and included with these forms, possessed three toes only.

RHINOPLASTIC OPERATION, the surgical operation of restoring the nose when lost by disease or injury (early practised in India by the Brahmans), by means of a triangular piece of skin cut from the forehead, and drawn down to its new position while still attached to the face by the lower angle, or the piece of skin may belong to the arm. In 1442 Branca, a Sicilian physician, operated by means of a piece of skin cut from the arm of the individual, and after him this method was preserved in the family of the Bajani as a secret, until Caspar Tagliacozzi (*Taliacotus* in Latin) practised it in Bologna, and made it public in 1597. Hence the operation received the name of the *Taliacotian operation*.

RHIO, or **RIOUW**, a seaport belonging to the Dutch, in the Indian Archipelago, on the islet of Tandjong Pinang, in a bay on the south side of the Island of Bintang, 50 miles south east of Singapore. It is defended by a fort, and consists of a European town, which is clean and handsome, and a Chinese or native town, which contrasts with it in both respects. Among many good buildings are the governor's house, a Protestant church, and a school. It was declared a free port in 1828, and having a capacious haven where large vessels find anchorage, carries on a considerable trade. It is the capital of a Dutch residency, comprising the islands in the immediate neighbourhood, forming the Rhio Archipelago, the Langa group, and the Tambelan, Anambas, and Natuna Islands as well as the districts of Kampar, Siak, and Indragiri, on the east coast of Sumatra. The population of the residency is estimated at 108,000.

RHIZANTHÆÆ, or **RHIZOCENÆ** (Greek, literally 'root flowering' plants), a remarkable group of plants, considered by Lindley as forming a separate class, which he placed in a position intermediate between the Thallogens and the Endogens. They resemble the former in the absence of leaves and in their loose cellular organization. Some, perhaps all, of them spring from a shapeless cellular mass analogous to the thallus of fungi. On the other hand, they resemble more perfect plants in having flowers and a complete sexual apparatus, with this difference, that the embryo has no visible radicle or cotyledon. They are all parasitical plants. In colour they are brown, yellow, or purple—never green. Their form is very various. The class was divided by Lindley into the orders Balanophoracæ, Cytinacæ, and Rafflesiacæ. These are now always placed among the dicotyledonous angiosperms, and in more recent systems they are classed with the polypetalous dicotyledons. The Cytinacæ are combined with the Rafflesiacæ, and the order classed in one group with Aristolochiacæ (birthwort) and Hydnoracæ. Balanophoracæ forms one member of a nearly related group, to which belong also Loranthacæ (mistletoe), &c.

RHIZOBOLACEÆ, the suwarro nut order, consisting of exogenous trees of large size, with opposite digitate leaves, flowers with five to six sepals more or less combined, five to eight unequal petals, and numerous stamens arising with the petals from a hypogynous disk, seeds reniform, exalbuminous, with a cord dilated into a spongy excrescence, radicle very large. There are only eight species known, consisting of large trees growing in the forests of South America. One of them (*Caryocar butyrosum*),

a gigantic tree of Demerara, yields the suari, suwarro, or surahwa nut, the kernel of which is esteemed as the most agreeable of the nut kind. The shell of the nut is thick and not easily broken, the fruit grows in bunches, and where the nuts are in contact they bear the marks of pressure, being prolonged into a narrow edge on one side, and rounded off on the other, resembling a pouch or bag with the mouth closed. The colour is a fine reddish brown. A bland sweet oil is expressed from the kernels. The difficulty of gathering the nuts, consequent on the great bulk of the trees, is said to be the reason of the restricted supply sent to this country. The timber is used in ship building.

RHIZOPODA. See PROTOZOA.

RHODE ISLAND, the smallest of the United States of North America, is bounded on the north and east by Massachusetts, south by the Atlantic, and west by Connecticut. Length, north to south, 49 miles; greatest breadth, 32 miles; area, 1,250 square miles. The surface, which in the north is hilly and rugged, but elsewhere generally level, is divided into two parts by Narragansett Bay, a fine body of water about 30 miles long by 15 miles broad, and containing several islands, and among others the one which gives the state its name. The principal rivers are the Pawtucket and the Pawtuxet, both affluents of the Providence, which falls into Narragansett Bay, and the Pawcatuck, which falls into Stonnington Harbour. The climate, particularly that of the island of Rhode Island (which has an area of 50 square miles) is mild and equable, and well adapted, from its pleasant summers and temperate winters, for invalids from the south. The soil (except on the malarious portion of the state) is only of indifferent fertility, but from careful and skilful cultivation raises good crops, particularly of Indian corn and oats. Manufactures form the staple industry, and cotton and woollen goods give employment to numerous mills and factories, and a few vessels are built. The foreign trade, once considerable, has greatly decayed in consequence of the rivalry of neighbouring ports possessed of greater advantages. Length of railways open for traffic at end of 1892, 223 miles. The chief religious denominations are the Baptists, Congregationalists, Episcopalians, and Methodists. For the higher branches of education the only collegiate institution is Brown University at Providence. In 1900 there were 61,000 pupils in the elementary schools, and over 3000 in the secondary schools. The government is vested in a governor, a senate of thirty-seven members, elected for four years, and a House of Representatives of seventy-two members, elected annually by universal suffrage. The state sends two deputies to the House of Representatives of the general Congress of the United States, and, like all other states, is represented by two members in the Senate. The most important town is Providence, but there is no proper capital, as the legislature holds its sittings not only at it, but also at Newport. Rhode Island was first settled in 1639 by a small colony headed by Roger Williams, who had been banished from Massachusetts for his religious opinions. Others banished for the same cause joined him in 1638. A charter was afterwards obtained from Charles II securing universal toleration, and vesting the government in a governor, deputy governor, ten assistants, and representatives chosen by the freemen of the towns. This form of government continued in force, with a few modifications, till the adoption of the present constitution in May, 1843. Pop. in 1870, 217,353, in 1890, 345,506, in 1900, 428,556.

RHODE ISLAND, an island situated in Narragansett Bay, lat 41° 25' N, lon 71° 20' W. The state of Rhode Island takes its name from this

Island It is about 15 miles from north to south, and $8\frac{1}{2}$ wide, and is divided into three townships—Newport, Portsmouth, and Middletown. It is a noted resort for invalids from southern climates. The island is very fertile, pleasant, and healthful. Numerous sheep are fed on the island, besides cattle and horses.

RHODES (ancient Greek, *Rhodos*, Latin, *Rhodus*), a Turkish island in the Mediterranean, off the south-west coast of Asia Minor, from which it is 12 miles distant. It measures about 45 miles in length from south-west to north-east, greatest breadth, about 20 miles, area, 440 square miles. Lengthwise it is traversed by a chain of mountains, reaching in Attaro a height of 4070 feet. The surface is generally irregular, but much of it is very fertile, though cultivation is in an extremely backward state. The climate is delicious. The island is sufficiently well watered, though the streams are small. Coniferous trees are still abundant, as are also pistachios, myrtles, rhododendrons, &c. Wheat, barley, olives, cotton, grapes, figs, oranges, and other fruits are amongst the principal productions. Of cereals, however, there is not enough raised to supply the home demand, but fruit, vegetables, olive oil, are exported in considerable quantities, as are also sponges. The pop. is estimated at about 30,000, about 20,000 being Greeks. The capital is Rhodes (see next art.).

Rhodes was a celebrated island in antiquity. The oldest traditions point to an early settlement of the island by some of the civilized races of Western Asia. Subsequently, but still at an early period, it was settled by Dorians from Greece. Homer mentions three Dorian settlements, Camirus, Lindus, and Ialysus. The Rhodians soon became an important maritime people, and founded colonies in Sicily, Italy, and Spain, and on the coasts of Asia Minor. Their maritime laws were excellent, and were regarded on all the coasts of the Mediterranean as embodying the fundamental principles of international law. At the beginning of the Peloponnesian war the Rhodians were subject to Athens, but in 412 B.C., the twentieth year of the war, they joined Sparta. For a time the Spartan or oligarchical party maintained the ascendancy, but it was in constant conflict with the Athenian or democratic party, and the island was subject to Sparta or Athens according as the one or the other party got the upper hand. This continued till the conclusion of the Social war in 355 B.C., when the independence of the island was acknowledged by both. It was compelled by Alexander the Great to submit to the Macedonian yoke, but regained its independence after his death, and rose to power and prosperity, so that it even received from the Romans Caria and Lycia in return for the assistance rendered them in the war with Antiochus the Great of Syria early in the second century B.C. About twenty years later (168 B.C.) it lost the favour of Rome by siding with Perseus, for which it was punished by the loss of its possessions in Asia Minor. In the first century after Christ it was made part of a Roman province. It does not again acquire importance till the middle ages. About 651 it was taken possession of by the Caliph Moawiyah, and in the following centuries was a frequent subject of contest between Christians and Mohammedans. At the beginning of the fourteenth century it was divided between Greek and Turkish masters, and only owed a nominal allegiance to the Byzantine emperor, when in 1309 (according to Gibbon, August 15, 1310) it was taken by the knights of St John, from this time often called the knights of Rhodes. By them it was held till 1522, when they were forced to surrender their capital to Solyman II., and to abandon the island to the Turks, with whom it has remained ever since.

RHODES a town at the north-eastern extremity of the island of the same name. Although greatly reduced from what it was in ancient times, it still has an imposing appearance. There are several churches converted into mosques, a convent, and the palace of the grand masters, a college or medresa, and a small public library. Its harbour, formerly so famed, is now half filled up with sand, and only accessible to small vessels. It is divided into two by a ruined mole, on the end of which is a lighthouse, and which protects the inner basin from all winds. It is supposed that the famous Colossus stood beside the passage from the outer to the inner basin. The Colossus, the work of an artist named Chares, was made of brass, and was erected in honour of Apollo, the tutelary deity of Rhodes, and is said to have been 105 feet high. It was set up about the year 278 B.C., and was thrown down by an earthquake fifty-six years thereafter, and lay where it fell for nearly 890 years, or till A.D. 667, when the island having been taken by the Saracens, they broke the statue to pieces, and sold the brass. Rhodes was founded in 408 B.C. and was in ancient times one of the most celebrated of Greek cities, and particularly distinguished for its wealth, commerce, and naval prowess, being one of the last which surrendered to the Roman arms. It was no less distinguished for the beauty and regularity of its architecture and for its literary eminence, which made it, so to speak, one of the great university towns of the ancient Roman world. In the year B.C. 305-304 it successfully resisted the siege laid against it by Demetrius Poliorcetes, who ultimately concluded a treaty with the Rhodians, and in admiration of their heroic defence presented them with the engines that he had used in the siege. It was again unsuccessfully besieged from May 25 to August 17, 1480—on this occasion by the Sultan, Mahomet II. On the 22d of December, 1522, it surrendered to Solyman II. after a siege of seven months. It is subject to earthquakes, and has been much injured by them in recent years. Pop. about 10,000.

RHODIUM. See RHOEN.

RHODIUM, a metal belonging to the platinum group, discovered by Wollaston in 1804. It occurs in small quantities in various platinum ores. Rhodium is a grayish white metal, it is very hard, very infusible, scarcely softening in the flame of the oxy-hydrogen blowpipe; it is unaltered in the air at ordinary temperatures, but oxidizes at a red heat. It is insoluble in acids, but is readily oxidized by fusion with nitre. The specific gravity of fused rhodium is 12.1 its atomic weight is 103. The compounds of this metal have not been much studied.

RHODODENDRON the name of a genus of evergreen shrubs with beautiful flowers, belonging to a sub-order of the Ericaceae, and chiefly inhabiting the mountainous regions in Europe, North and South America, and Asia. The rhododendron (says Paxton) is decidedly one of the finest of all known genera, containing some of the most handsome, elegant, and showy shrubs, all of which are admirably adapted either for ornamenting the greenhouse or shrubbery, or for planting singly on lawns. Peat soil is most suitable to these plants, but they may also be grown in sandy loam or vegetable mould. The varieties are very numerous, and the colours range through rose, pink, lilac, scarlet, purple, red, and white. *R. chrysanthum* a Siberian species, possesses narcotic properties, *R. terriupneum* and *hiraultum* are abundant on the Swiss Alps, *R. Dalhousie* is an epiphytic species. Dr Hooker found *R. nivale* on the Thibetan mountains at a height of 16,000 to 18,000 feet. Major Madden states that in Kumaon *R. arboreum* attains a height of 40 feet.

RHÔNE, a department in France, bounded on the north by Saône-et-Loire, on the east by Ain and Isère, and on the south and west by Loire, area, 1077 square miles. The Cevennes stretch from north to south along its western frontier, but the surface lowers rapidly eastward to the Saône and Rhone. The principal crops are wheat, buckwheat, maize, and potatoes. The vine and mulberry are also extensively cultivated. The minerals include coal, in limited extent and of inferior quality, argenterous lead and copper. Manufacturing industry is largely developed, and in no part of the world are the finer sorts of silk goods produced in greater perfection. The other leading manufactures are muslin hats, tinsel, liqueurs, starch, paper, and glass. The department is divided into the two arrondissements of Lyon and Villefranche, and is subdivided into twenty nine cantons and 268 communes. The city of Lyons is the capital. Pop in 1901 935,157.

RHÔNE (anciently, *Rhodanus*), a river in Europe which rises in Switzerland, near the east frontiers of the canton of Valais, about 18 miles w s w of the source of the Vorder Rhein. Its precise origin is commonly said to be in the Rhône glacier, between Mount Furca on the east, the Gallenstock on the north, and the Grimsel on the west, 5581 feet above the level of the sea, but the natives give the name of Rhodan or Rotten to three springs situated in a single basin at the foot of the Mayenwand, at an elevation of 5282 feet, the water of which flows with an equal temperature in summer and winter (61° to 63° Fahr.), and these they consider to form the true source of the Rhône. The waters from these springs join the stream from the glacier at a very short distance from their origin. The young river dashes down with great rapidity into the valley beneath, leaping from cascade to cascade, traverses the centre of Valais in a westerly direction, and near Villeneuve enters the Lake of Geneva at its eastern extremity. On entering the lake its waters are surcharged with mud, but on issuing from it, at its south west extremity, at the town of Geneva, it is of a pure deep blue colour, soon after changed into a muddy brown by the accession of the glacier born Arve, which joins it 1½ mile below Geneva. Proceeding southwest to the frontiers of the department of Ain in France, it turns almost due south, forming the boundary between that department and Savoy, then turning suddenly north west, traces the boundary between the same department and that of Isère, and reaches Lyons. Here, having at least doubled its volume by the accession of the Saône, it proceeds almost due south, separating the departments of Rhône, Loire, Ardèche, and Gard on the west, from the department of Isère, Drôme, and Vaucluse on the east. On approaching Avignon it takes a more circuitous but still southerly course, separates the department of Gard from that of Bouches du Rhône, traverses part of latter department, and finally falls into the Gulf of Lyons in the Mediterranean. At Arles it divides into two branches, the less of which, under the name of Old Rhône, flows south west, forming the west side of the large delta, known by the name of the île de Camargue. The main branch, under the name of Grand Rhône, continues its southerly course, but again divides into two branches, and enters the sea by two mouths. The most important towns watered by the Rhône are Sion and Geneva in Switzerland, and Lyons, Vienne, Tournon, Valençay, Viviers, Pont St. Esprit, Avignon, Tarascon, Beaucaire, and Arles in France. The principal affluents are, on the right, the Valserine, Ain, Saône, Doux, Erioux, Ardèche, Ceze, and Gard or Gardon, on the left the Dranse, Valaisane, Arve, Fier, Guiers, Bourbe, Gère, Galvaue, Isère, Drôme, Roubion, Lez, Aignes, Sorgues,

and Durance. Its whole course is about 580 miles, of which 200 miles are in Switzerland, and 380 miles in France. It is navigable for 360 miles. The basin of the Rhône, the area of which is 38,055 square miles, is bounded on the east by the Lepontian, Pennine, Graian, Cottian, and Maritime Alps, south east by the most southern ramification of the Maritime Alps, north by the Bernese Alps, Jorat, Jura, Voeges, and Faucilles, and west by the Cevennes and Côte d'Or. By means of a series of magnificent canals, the navigation of the Rhône has been continued, without interruption, to the Rhine (through the Saône), Seine, Loire and Garonne.

RHÔNE, BOUCHES DU See **BOUCHES DU RHÔNE**.

RHUBARB (*Rheum*), a genus of plants belonging to the natural order Polygonaceæ. The genus contains about twenty species, natives of central Asia, closely akin to the dock genus (*Rumex*), from which it differs chiefly in having nine stamens. The petalate stigmas are three in number, the fruit three winged, the stem upright, strong branched, and covered in bud by membranous sheaths, the rootstock branched, fleshy, and strong, the leaves petiolate very large, palmately veined, entire or lobed and toothed, and the small flowers whitish or red in colour arranged in large panicles of many flowered clusters. The most important species is *R. officinale*, a native of eastern Tibet and western China. This species is the chief source of medicinal rhubarb, which is obtained from its rootstock, but several other species, such as *R. palmatum*, *R. undulatum*, *R. Rhaponticum*, &c., also contribute to the supply. Formerly rhubarb was imported to Europe overland by way of Russia, whence the name *Russian rhubarb*, but since the opening of Chinese ports to European commerce it comes direct from China by sea. Various kinds are distinguished by names indicating the part of China from which they come. Rhubarb is used in medicine chiefly as a purgative. In small doses it forms a valuable tonic to the stomach, and in such a case its effect is slightly astringent. It is useful in cases of diarrhoea or piles. The chief preparations are tincture of rhubarb, Gregory's powder, and the compound rhubarb pill. The common rhubarb, cultivated for the sake of its acidulous leaf stalks, consists mainly of *R. Rhaponticum*. The leaf stalks are used in making tarts, preserves, &c., and also for producing a kind of wine. The rootstocks are also employed medicinally.

RHUDDLAN, a borough, port, and parish of North Wales, in the county of Flint. The town is 3 miles n n w of St Asaph, and about the same distance from the sea, on the right bank of the Clwyd. It has the ruins of a magnificent castle, said to date from the beginning of the eleventh century, the remains of an old Cistercian abbey, and the fragments of the building where King Edward I held his Parliament in 1283, when he passed the statute of Rhuddlan, making new regulations for the government of Wales. Rhuddlan unites with Flint, &c., in returning a member to Parliament. Pop of ecclesiastical parish in 1891, 1230.

RHUMB LINE, a line described on the earth's surface by a ship sailing steadily in the direction of any one point of the compass, except one of the four cardinal points. A rhumb line laid down on a map drawn on the principle of Mercator's projection is a straight line cutting the meridians at a constant angle, but if a rhumb line be drawn on a globe, so that it will cut the meridians all at the same angle, it will be found to be a spiral curve such that however far it may be produced it will always approach the pole, but never reach it. This spiral is called a *loxodromic curve*.

RHUMBS, the points of the compass. See COMPASS.

RHUS. See SUMACH.

RHYL, a watering place in North Wales, in the county of Flint, $5\frac{1}{2}$ miles north west of St. Asaph, and about 3 miles north west of Lhuddlan. It is 30 miles by rail from Chester, and about the same distance from Bangor. It has a fine sandy beach, and possesses the charm of a most interesting country at the back. The climate is dry and the winter temperature high. Pop (1891), 6491, (1901), 8473.

RHYME, **RHIME**, or **RIME**, in poetry, the correspondence of sounds in the terminating words or syllables of verses. The vowel and the final articulations or consonants should be the same in sound. The initial consonants ought to be different. In languages which have not, like the English, a great variety of shades between the sounds of *a, e, i, o, u* (pronounced as in Italian), writers adhere strictly to this rule, that is to say, the corresponding syllables have exactly the same vowel sound. English writers have allowed themselves certain licences, and we find in the best English poets rhymes which strike an accurate ear as incorrect. In some instances, such as *sky* and *liberty*, *hand* and *command*, *gone* and *alone*, the correspondence in the letters makes what might be called a rhyme to the eye, which supplies, in some measure, the want of correspondence in sound. In other instances, however, this is not the case, as in *vengeance* and *change*, *remote* and *thought*. Such rhymes may be tolerated if they only occur at rare intervals, but they must certainly be regarded as blemishes, and are carefully avoided by all who wish to write harmoniously. If the rhyme is only in the last syllables, as in *foi* and *loi*, it is called a *male* rhyme, if in the two last syllables, as *butter* and *glitter*, it is called a *female* or *double* rhyme. Sometimes the last three syllables rhyme, as *callosity* and *reciprocity*, or the Italian *dante* and *duane*, or *tavola* and *faola*. This is called a *triple* rhyme, in Italian *verso sdrucciolo*. This last sort of rhymes is principally used in pieces of a comic or conversational character. Rhymes which extend to more than three syllables are almost confined to the Arabians and Persians in their short odes (*gazelles*), in which the same rhyme, carried through the whole poem, extends sometimes to four and more syllables. Some languages incline more to the male rhyme, as the English, on account of its superabundance of monosyllables, others, as the Spanish and Italian, more to the female: the German and French possess an almost equal store of both. The female rhymes in French all contain an *e* mute in the last syllable, and from the beginning of the sixteenth century it has been the almost uniform practice among French poets in dramatic, heroic, elegiac, satirical, and other forms of poetry to make couplets of male rhymes alternate with others of female rhymes. In the ode combinations of rhymes are used, but always regular. In the fable no fixed rule as to rhyme is observed at all.

The modern use of rhyme was not known to the ancient Greeks and Romans. We meet, indeed, with some rhymed verses in Ovid, in which the rhyme was evidently intentional, but these examples are rare. It has been used, on the other hand, from time immemorial among the Chinese, Hindus, Arabs, and other oriental nations. Rhyme began to be developed among western nations in the Latin poetry of the Christian Church. It is found used as early as the fourth century, and in subsequent centuries it became so prevalent that *carmen rhythmicum* acquired the sense of 'rhymed poem,' and *rhythmus* came to be used for rhyme. Our spelling of the word rhyme is probably due to this fact, which led to the supposition of a connection between it and

rhythmus, although the word is more probably of Teutonic origin, and if connected with *rhythmus* at all, only very remotely. The use of rhyme in the vulgar dialects of Latin was even more general than in ecclesiastical poems, as is shown by the poetic monuments of the Romance nations belonging to the ninth and tenth centuries. In the Latin poems of the fathers of the church of the fourth century rhymes are more frequently used. The most ancient relics of Teutonic and Scandinavian poetry are not in rhyme, but are distinguished by alliteration. The earliest use of rhyme in a Teutonic dialect is in Otfrid's *Evangelii*, written in Frankish, in the latter part of the ninth century. The oldest forms of rhymed verse are the couplet and the continuation of one and the same rhyme through a whole piece. Sometimes rhymes occur at the middle and end of a verse. Such verses are called *Leonine*. (See LEONINE VERSES.) The Troubadours first attempted a variety of artificial combinations of rhyme in the sonnet, canzone, &c., and the Spaniards and Italians, with their musical languages and delicacy of ear perfected the forms of involved rhyme. The Italians, however, at a later period, carried the artificial intricacies of rhyme to great excess.

RHYMER, THOMAS, of Freelandoun, or Earliston, in Berwickshire, otherwise called THOMAS THE RHYMER, was a poet or romancer, who flourished during the thirteenth century. To this day the name of Thomas the Rhymor is popularly known in Scotland as that of a prophet, and it is only through a discovery of the manuscript of a metrical romance called *Sir Tristram* (supposed to be his work, though this is still a matter of dispute) that he has acquired a better claim to remembrance. The Prophecies of Thomas the Rhymor were published at Edinburgh in 1603 and 1615 and were repeatedly reprinted. The romance of *Sir Tristram* was considered to be lost till a copy was discovered among the Auchinleck manuscripts in the library of the faculty of advocates, Edinburgh, and published, with introduction and notes, by Sir Walter Scott. A better edition is that of G. P. McNeill (Scottish Text Society, 1886). See also Dr. J. A. H. Murray's edition of the Romance and Prophecies of Thomas of Freelandoun (Early English Text Society, 1875), and Child's *Popular Ballads* (pt. ii., 1884).

RHYTHM, in general, means a measured division of time. The rhythm in dancing is made manifest to the eyes by steps, and in music and language to the ears by tones. We must refer the fondness for rhythm in the human mind to its love of order, harmony, symmetry, which lies at the basis of all the arts. As song, music, and dancing sprung from the same sources, and in the earliest periods of nations are actually united, the rhythm of all three has much in common. The rhythm of poetry is susceptible of the same exact divisions of time as the rhythm of dancing and music, but rhetorical rhythm is satisfied with a pleasing cadence of syllables—an approximation to the rhythm of verse, particularly at the beginning and end of periods. The orator or eloquent prose writer arranges his words in an expressive and pleasing succession, but he does not follow precise rules, like the versifier. The poetical rhythm, like every species of rhythm, requires a succession of motions of regular duration, which, variously interrupted, must yet be obvious, and combined, according to the rules of beauty and grace, so as to form a harmonious whole. In order to make rhythm please its constituent parts must excite the feeling of variety in harmony or unity. The various parts must form a whole, and exhibit a beginning, middle, and end, by a measured rise and fall. Those parts which receive the *ictus*, the stress of the rhythm, are called

arsis (elevation), the other parts *thesis* (*positio*, de pression) To denote the *arsis* the common acute accent is used (´), for example—

Singula quæque locum teneant sortita decónter

The *arsis* must by no means be confounded with the long syllable, nor the *thesis* with the short syllable. The smallest rhythmical magnitude is the foot, by which every union of *arsis* and *thesis* is understood. A single word may constitute a foot, or the beginning and end of the foot may be in the middle of words. Rhythm can be imagined without words, and may be indicated by notes, or other signs of long and short syllables. Hence the rhythm may also be divided differently from the words, as we have just seen, and the division of the words should not agree with the rhythmical feet, except where a rhythmical series is concluded, or the pausing of a part of the same requires a break in the text. In all other cases the divisions of the rhythm ought to separate the parts of words as much as possible. Such a dividing of the words of a line by the feet is called *cæsuræ*, and this name is also applied to the syllable or syllables so cut off from a word. The Romans divided the rhythmical feet, according to the number of syllables, into four of two syllables, eight of three syllables, and sixteen of four syllables, and called them, with the Greeks, thus—

1 Feet of two Syllables.

- — Pyrrhichius
- — Spondus
- — (Choræus, or Trochæus)
- — Iambus

2 Feet of three Syllables.

- — — Tribrachia
- — — Molossus
- — — Dactylus
- — — Anapaustus
- — — Amphibrachia
- — — Amphimacer
- — — Bacchæus
- — — Palimbacchæus, or Antibacchæus.

3 Feet of four Syllables

- — — — Proceleusmaticus (Dipyrhichius)
- — — — Diapendæus
- — — — Dichoræus, or Ditrochæus.
- — — — Diambus
- — — — Choriambus
- — — — Antispæstus
- — — — Ionicus a minore
- — — — Ionicus a majore
- — — — Peon primus
- — — — Peon secundus
- — — — Peon tertius
- — — — Peon quartus
- — — — Epitritus primus
- — — — Epitritus secundus
- — — — Epitritus tertius
- — — — Epitritus quartus

These feet are simple or compound, redundant or retrenched. The first consist of but one *arsis* and *thesis*, as — — — —, — — — —, — — — —, &c. The second consist of two of each sort, of which one *arsis* and *thesis*, taken together, is considered as a single *arsis* or *thesis*, as — — — —, — — — —, — — — —, or — — — —. The third are such as contain, besides a simple foot, a short prefix or affix, or in which feet of unlike quantity are connected with each other, as — — — —, — — — —, — — — —, — — — —, — — — —, — — — —, — — — —. The fourth sort are feet which, with two *arses*, have but one *thesis*, or have two *arses* immediately succeeding each other without a *thesis* between, for example, — — — —, — — — —, — — — —, or — — — —, — — — —, — — — —, — — — —, — — — —, — — — —. Of the simple feet, those only which have a long syllable in the *arsis*, and a short syllable in the *thesis*, afford natural variety, as

— — — —, — — — —, — — — —, — — — —. The trochee and dactyl, therefore, the iambus and anapest, are considered as the fundamental feet of all rhythm, with which the other feet can be brought into connection by resolving a long syllable into two short ones, or by contracting two short into one long. For more information see *VERSE*.

RHYTINA, a genus of Sirenian Mammalia, which became extinct not long after its first discovery, having been exterminated by the agency of man. The Sirenia (which see) are sometimes classified with the Whales or Cetacea, but differ from the latter in many points. Living examples of this group are seen in the Manatee (which see) and Dugong or Halicore. The Rhytina, of which but one species, *R. Stelleri*, was known, was discovered on a little island called Behring's Island, situated in Behring's Straits, off the coast of Kamtchatka, in 1741, by a party of shipwrecked sailors belonging to Behring's crew, Steller being one of the party who described the Rhytina, and his description being afterwards published at St Petersburg. These animals were of large size and unwieldy bulk, and being defenceless, and easily taken, afforded food to the shipwrecked mariners. The average length appears to have been about 25 feet, the circumference being stated to average 20 feet. True teeth hardly existed, but on each side of each jaw a large bony or fibrous plate existed, occupying very much the position of the molars. These plates were not true teeth, but may be compared to the horny pad seen in front of the upper jaw of Ruminants, or more nearly, to the horny plates found in the mouth of existing Sirenia. The skin was thick, and appears to have been destitute of hairs. The tail fin was crescentic in form, and front limbs only, in the form of swimming paddles, were developed. The last Rhytina was killed in 1768—just twenty seven years after the first discovery, by modern science at least, of these forms, the subsequent visits of ships in search of seals and sea otters completely exterminating the species.

RIAZO. See *VRNICE*.

RIAZAN, a government in Russia, bounded north by Vladimir, north west by Moscow, west by Tula, south and east by Tambov, area, 16,249 square miles. The surface is finely diversified by hills and undulating plains, and the soil is remarkably fertile in the south, but less so in the north, where there are several extensive marshes. The only important river is the Oka, which directly, or by its affluents, drains the whole government, except a small part in the south drained by the Don. Cereals of all kinds are produced for export, and hops and tobacco are extensively grown. The pastures feed great numbers of fine cattle, and the rearing of bees forms an important branch of rural economy. The woods furnish excellent timber, partly hardwood, but chiefly pine. The most important manufactures are linen and hosiery. Pop (1897), 1,827,539.

RIAZAN, a town in Russia, capital of the government of same name, at the confluence of the Trubeshch and Lebeda, 105 miles south east of Moscow. It is inclosed by palisades and an earthen rampart, is poorly built, for the most part of wood, and has numerous churches, including three cathedrals, a large and handsome structure containing the courts and public offices, several monasteries, a gymnasium, and diocesan seminary. The manufactures are woolsens, linens, needles, and leather, and the general trade is considerable. Pop (1897) 44,552.

RIB, the name given to the slender curved bones which in man and the other Vertebrates spring from the spine or vertebral column, and which may or may not be joined to a sternum or breast-bone in front. The ribs ordinarily agree in number with the ver-

tebræ of the back or dorsal region. Thus in man twelve dorsal vertebrae and twelve pairs of ribs exist. Of these the first rib is shorter and stouter than the others, and the seven upper pairs of ribs (*true ribs*) join the breast bone in front by means of intervening or *costal cartilages*. The five lower pairs of ribs are termed *false ribs*, and do not reach the breast bone, and of these five pairs the upper three (8th, 9th, and 10th pairs) pairs are joined to the cartilages in front, whilst the 11th and 12th pairs, being free in front, are sometimes termed 'floating ribs.' Ribs are wanting in such lower fishes as the Lancelet, Lampreys, &c., and in Amphibians, such as Frogs and Toads. The number of these bones may be very great, as in Serpents, and in Serpents and Chelonians they are not attached in front to any breast bone. Ribs are occasionally developed in regions other than the thorax or chest, and on the dorsal vertebrae. Thus the cervical or neck region may possess ribs, as in Crocodiles and other Reptilia, whilst the sacrum or pelvic region (see *PELVIS*) may develop these structures, then termed *sacral ribs*, seen in Birds. The caudal or tail region may possess ribs, as in Menobranchius, an Amphibian form. They may be greatly elongated, as in the Flying Dragon or Lizard, in which certain of the ribs give support to the patagium or wing membrane. In the Cobra de Capello the ribs of the neck, by their sudden erection, expand the skin when the serpent is irritated. The Serpents move on the free extremities of the ribs, whilst in the Tortoises and Turtles they are broadened, and united together to form part of the characteristic 'carapace' of these forms. In Fishes and Amphibians the ribs consist each of a single undivided piece only, and in some fishes (for example, Polypterus and the Tunny) two distinct sets may be developed on each side of the body. In man each rib has a double attachment to the vertebra. It articulates with the vertebra by its *head* and by its *tubercle*, this latter prominence articulating with the transverse process of the vertebra. The ribs, spine, and sternum together form the frame work known as the *thorax* or *chest*, which contains the heart and lungs as the chief viscera, and which in Mammalia alone is completely shut off from the abdomen by a muscular partition, the diaphragm or midriff. The movements of the chest in respiration are described in the article *RESPIRATION* (which see).

RIBBLE, a river of Yorkshire and Lancashire, which rises at Wharfedale Mountain, and flows generally S and S.W. till it expands below Preston into an estuary of the Irish Sea, about 5½ miles in width, between Lytham and Stockport. Since 1855 vast river diversion works, and the construction of a dock at Preston, have been going on, which, when completed, will greatly improve the navigation of the river. Over £1,000,000 has been spent.

RIBBON, a narrow web, generally of silk used for tying and ornamental purposes. Ribbon weaving is a special branch of the textile industries. In modern looms as many as forty ribbons are simultaneously woven in one machine. Ribbon weaving was established near St. Etienne in France in the eleventh century, and is now carried on here on a great scale. In England Coventry is an important seat of this industry, which is also carried on at Norwich and Leicester. Mixed fabrics of silk and cotton are now largely employed.

RIBBON FISHES, the name of certain deep sea fishes met with in all parts of the ocean, generally found floating dead on the surface, or thrown ashore by the waves. The body is like a band from 15 to 20 feet long, 10 to 12 inches broad, and an inch or two thick. These fishes are generally silvery in colour. They live at such a depth that when they

reach the surface the expansion of gases in the body so loosens all parts of the muscular and bony system that some portions are nearly always broken on lifting them out of the water. The fin rays in young ribbon fishes are extraordinarily developed, some of them being several times longer than the body. The deal fish (*Trachipterus arcticus*) is often met with in the N. Atlantic, and is sometimes found after gales on the Scottish coasts.

RIBBON-GRASS, CANARY GRASS, a garden variety, striped with green and white, of *Phalaris arundinacea*, a grass which is found in its wild state by the sides of rivers. Called also *gardener's garters*.

RIBBONMEN, the members of a secret society organized among the Roman Catholics in Ireland about the beginning of the nineteenth century, originally, it is said, in opposition to that of the Orange men. The society was the successor of that of the Defenders formed at the end of the previous century. Its objects seem to have differed in different places or at different times, its aim being sometimes directed against rack renting and evictions, at other times against the tithe proctors. The organization of the society was similar to that of the Orange men, but by no means so complete. The membership from the first was drawn almost exclusively from the lowest classes of the population.

RIBBON WORMS, a group of Annuloid animals, not included amongst the true Annelida or 'Worms,' but allied in some essential points rather to the Tape worms and kindred forms. The Ribbon worms belong to the sub order Nemertida (which see), which division forms a group included in the order Turbellaria (Platyelmin or 'Flat worms'). The Ribbon worms are recognized by their elongated worm like bodies, by the fact that the alimentary canal terminates in a distinct anus or vent, by the presence of a distinct perivisceral or body cavity, by the water vascular system in the adult not communicating with the exterior, and by the sexes being generally situated in distinct individuals. A protrusible proboscis also exists, and a 'pseudo-himal' system of vessels is developed in addition to the water vascular apparatus. Reproduction may be subserved by ova, and through asexual reproduction by internal gemmation or budding, or by transverse fission or division of the body substance. In Nemertes, a typical genus, the embryo developed from the egg goes through a kind of metamorphosis closely imitating the development of the larva of Echinodermata (which see). These forms are marine in habits. One of the most celebrated is the genus *Borlasia*, of which various species are known. This organism appears as a worm of very great length, a common length being 20 or 25 feet. It lies during the day coiled up amongst stones and sea weed, and appears to be chiefly nocturnal and carnivorous in its habits. *Borlasia camilla* is a species of this genus, the species of which form some of the most curious and interesting organisms inhabiting the sea beach.

RIBE, or **RIBEN**, a town in Denmark, in the south west of Jutland, near the borders of Schleswig, about 8 miles above the mouth of the Ribe or Nipsaue, which nearly encircles it. Its principal edifice is a large cathedral, which was built in the twelfth century, and contains the tombs of several Danish kings. It has some manufactures, chiefly of a knitted woollen fabric called Ribetoi, or Ribe cloth. Ribe is one of the oldest towns in Denmark, and was once very flourishing. It had a good harbour, eleven churches, seven convents and a castle, Riberhus, which in the seventeenth century was destroyed by the Swedes, only the foundations being still visible. It was at Ripen that the great Elector of Brandenburg con-

cluded a defensive alliance with Frederick III of Denmark on the 21st of January, 1659. The town has greatly declined, partly from the shallowing of its harbour. Pop (1890), 4135.

RIBEAUVILLE (German, *Rappoltweiler*), a town of Germany, capital of a circle in Upper Elsass (Alsace), on the Strengbach 10 miles n by w of Colmar. It has remains of mediæval fortifications, many ancient houses, two old Gothic churches, a pilgrimage church of Notre Dame near the town, destroyed during the French revolution, but rebuilt and reconsecrated in 1894, a synagogue, town hall, schools, hospitals, manufactures of cottons and kather, besides flour and saw mills, quarries, &c., a trade in wine, and a mineral spring, known in the Middle Ages, rediscovered in 1888. Pop (1895), 6052.

RIBIŦA, GIUSEPPE. See SPACIOLETTO.

RIBIS, a genus of plants of the natural order Grossulariaceæ, comprehending the Gooseberry and the Currants. The petals are small and scale like, the stamens included, or nearly so, in the corolla, the style erect, and in all the four British species the ovary has nerve like placenta. The gooseberry, the black currant, and the red currant are well known and valuable fruits. *Ribes sanguineum* and other species are prized as ornamental garden shrubs.

RICARDO, DAVID, a celebrated writer on finance and political economy, was of a Jewish family, and was born in London in 1772. His father was a stock broker, and the son was intended for the same profession. He was at first connected with his father's business, but this connection was dissolved in consequence of his embracing Christianity and marrying a Christian woman (1793). He then adopted the business of stock broking on his own account, and his character for probity, industry and talent soon procured him abundant support, so that in a comparatively short time he realized an immense fortune. In 1810 he appeared as a writer in the *Morning Chronicle*, on the subject of the depreciation of the national currency, and he afterwards embodied his ideas in a distinct work, the reasonings of which were adopted in the Report of the Bullion Committee of the House of Commons. He next published an *Essay on Rent*, in which he advocated the principles of Malthus on increasing population. In 1816 he published a pamphlet entitled *Proposals for an Economical and Secure Currency*. What he proposed was to supersede the use of gold coin by making bank notes exchangeable for gold bars of the standard purity at the mint price of gold. His most important production is his treatise on *Political Economy and Taxation* (1817), which on its first appearance was hailed by many economists as revolutionizing the science of which it treats, but which is now usually spoken of in less hyperbolic language. In 1819 (having retired from business in the previous year) Ricardo obtained a seat in Parliament for the Irish borough of Portarlington, and as a senator attracted the respect and esteem of all parties. In 1822 he published a pamphlet on *Protection to Agriculture*, which is pronounced by Macculloch a *chef d'œuvre*. He died on 11th September, 1823. In 1846 his works were published in one volume 8vo, with *Life*, by J. R. Macculloch, his *Political Economy*, as edited by Prof. Gonnor, was published in 1891.

RICCI, MATTEO, the founder of the Roman Catholic missions in China, born at Macerata in the March of Ancona, on the 6th of December, 1552, died at Peking on the 11th of May, 1610. In 1571 he entered the order of the Jesuits, and in 1577 he accompanied Valignan, the visitor-general of the missions of the East, to India. He was afterwards one of the first to be chosen to attempt the introduc-

tion of Christianity into China. After some studying of Chinese he proceeded to Canton, taking advantage of the permission granted to the Portuguese to trade with that town at certain seasons, but it was only in 1583 that the fathers succeeded in gaining the favour of the governor of Canton, and obtaining permission to settle at Tchao king foo, 60 miles up the Si kiang. Recognizing the impossibility of maintaining himself in China if he openly condemned the morals, customs, and beliefs of the people, he determined in the first place to gain for himself the consideration that they pay only to the learned. He therefore published a map of the world with the names written in Chinese, and a small catechism in which were brought out only the general principles of Christian morality. These two works spread rapidly, and gave the Chinese a high idea of his knowledge. He was visited by some of the most enlightened of the natives, who testified their high esteem for him. Nevertheless he was exposed to a good deal of persecution, and was ultimately compelled to withdraw from the place where he had first settled. In 1595 he determined to leave the south of China and proceed to Peking, for he was convinced that his presence at the court would be of infinitely more service to Christianity than the attempts of missionaries in the provinces. In carrying out this intention he had to encounter numerous difficulties, and it was not till 1600 that he reached his destination, and even then his journey was almost rendered fruitless by the proceedings of the officers charged with the duty of collecting the duty on goods brought into the city. Their cupidity being excited by the articles which he brought with him as presents to the emperor, they appropriated them and cast Ricci into prison. He had lost all hope of recovering his liberty when the monarch heard of the injustice done him, and ordered him to be received into his palace. The presents he brought were attentively examined by the emperor, whose curiosity was roused particularly by a clock and a watch that struck the hours. The missionaries were permitted to establish themselves at Peking, and to found a church, and Ricci himself, through his tact and integrity, enjoyed the royal favour to the end of his life, as he did also the esteem of the great and the learned. He had just completed at his death the memoirs of his mission, which were published at Augsburg in 1615, under the title *De Christiana expeditione apud Sinas suscepta ab Societate Jesu*. He wrote also several works in Chinese, besides those mentioned above. Of these the two most valued by the natives are, a *Dialogue on Friendship*, in imitation of that of Cicero, and a *Treatise on the True Doctrine of God*, the latter of which, altered a little as to the language, was included in the collection of the best Chinese works made at the instance of Kian lung.

RICCIARELLI, DANIELE, better known by the name of DANIELE DA VOITERRA, was born at Volterra in 1509, and having resolved to devote himself to painting, studied at Siena, first under Antonio Razzi, and afterwards under Baldassare Peruzzi. To complete his education he repaired to Rome, and was employed as an assistant to Perino del Vaga, but was indebted above all to the friendship of Michael Angelo, who not only instructed him, but gave him designs for some of his most celebrated works. His fame rests chiefly on a series of frescoes in the church of La Trinità de Monti, which employed him seven years. The altar piece representing the descent from the cross, and which was considered as Ricciarelli's master piece, was injured on one occasion by the fall of the dome of the church, and was restored, not very successfully, by Palmaroli. Michael Angelo not only helped him with his advice and superintended

the execution of his work, but is said to have himself supplied two of the principal figures. Ricciarelli is said to have given rather a singular proof of his gratitude Michael Angelo's Last Judgment, in the Vatican, so offended the eyes of Pope Paul IV by its audacity that he had determined to destroy it Ricciarelli saved it by clothing the offensive figures, but is said, in consequence, to have earned for himself the soubriquet of Il Braghettone (The Breeches maker) In the latter part of his life Ricciarelli applied himself also to sculpture, and there are several works in stucco by him in the church already mentioned He died at Rome in 1566 or 1567

RICE (*Oryza sativa*, natural order Gramineæ, see illustration on plate at GRASSES) This important article of food is now cultivated in all the warmer parts of the globe It was long known in the East before it was introduced into Egypt and Greece Pliny, Dioscorides, and Theophrastus mention it as being brought from India, but it was little cultivated in their time upon the borders of the Mediterranean It was introduced into America about the year 1697, and is now cultivated extensively in many parts of the south of Europe In Britain the chief supply of rice is from Patna and elsewhere in the East Indies, but the finest quality is produced in North and South Carolina in the United States Immense districts of country would have remained desolate and irreclaimable if nature had not granted to a simple grass the property of growing exclusively in inundated and marshy grounds An immense population is dependent on the rice crops, and when these fail thousands perish of hunger

The culm of the rice is from 1 to 6 feet high, annual, erect, simple, round, and jointed, the leaves are large, firm, and pointed, arising from very long, cylindrical, and finely striated sheaths, the flowers are disposed in a panicle somewhat resembling that of the oat, the seeds are white and oblong, but vary in size and form in the numerous varieties One species only of rice is known Its antiquity is very great 'Cast thy bread upon the waters, for thou shalt find it after many days, is a scriptural metaphor generally believed to refer to rice cultivation, which in Egypt is always sown whilst the waters of the Nile still cover the surface of the land The receding floods leave a thick deposit of rich alluvial silt, in which the rice plant grows luxuriantly, being naturally a marsh plant Rice can be profitably cultivated only in warm climates The Chinese obtain two crops a year from the same ground, and cultivate it in this way from generation to generation on the same soil, and without any other manure than the mud deposited by the water of the river used in overflowing it After the waters of the inundation have withdrawn, a few days are allowed for the mud to become partially dry, then a small plot is inclosed by an embankment, lightly ploughed and harrowed, and the grain, previously steeped in dung diluted with animal water, is then sown very thickly on it A thin sheet of water is immediately brought over it, either by a stream or the chain pump In the mean time other spaces are preparing for being planted in a similar manner When the plants are 6 or 7 inches high they are transplanted in furrows made by the plough, so as to stand about 1 foot apart every way, water is then brought over them, and kept on till the crop begins to ripen, when it is withheld, so that when the harvest arrives the field is quite dry It is reaped with a sickle, threshed with a flail or the treading of cattle, and the husk is taken off by beating it in a stone mortar, or passing it between flat stones, as in a corn on meal mill The first crop being cut in May, a second is immediately prepared

for by burning the stubble, and this second crop ripens in October or November After removal the stubble is ploughed in, which is the only vegetable manure such lands can be said to receive In Japan, Ceylon, and Java aquatic rice is cultivated nearly in the same manner A rice plantation requires constant attention The proprietor must make daily visits in order to see that the various aqueducts, flood gates, and embankments of the different compartments are all in order, and that the water constantly remains at the same height The maturity of the grain is ascertained by the yellowness of the straw, and it is harvested much in the same manner as other grains, with this difference, that in certain districts the tops only are cut Aquatic rice is cultivated by the Chinese even in the midst of rivers and lakes, by means of rafts made of bamboo, and covered with earth Mountain rice is cultivated on the mountains of the eastern islands and of Cochinchina, much in the same way as our barley, but it is to be observed that it is planted at the commencement of the rainy, and reaped at the beginning of the dry season, and also that these mountains receive from the atmosphere a much greater proportion of moisture than lower districts There is a kind of rice hardly enough to grow on the edge of the Himalaya snows, and which may probably at some future time prove a valuable acquisition to the European cultivator Rice is even cultivated in the south of Germany, and, from long culture in a comparatively cold country, has acquired a remarkable degree of hardness and adaptation to the climate, a circumstance which has frequently been alluded to as an encouragement to the acclimating of exotics It is found that rice seeds direct from India will not ripen in Germany at all, and even Italian or Spanish seeds are much less early and hardy than those ripened on the spot A crop has been obtained in England on the banks of the Thames In some parts of the East rice is freed from the husks by immersion in hot water, by which the grains are slightly swelled, and burst the envelopes

The most abundant varieties are known under the names of 'common rice,' 'early rice,' 'mountain rice,' and 'clammy rice' In the husk rice is known by the name of 'paddy' Although rice is more largely consumed by the inhabitants of the world than any other grain, it contains less flesh forming matter (nitrogenous), this essential element being, in 100 parts of rice, only 6.5, while its starchy, carbonaceous, or heat giving constituents amount to 79.5 The inhabitants of the East obtain from rice a vinous liquor more intoxicating than the strongest wine, and an ardent spirit, called *tal* or *arak*, is also partly made from it (See ARACK)

RICE BUNTING, or REDD BIRD This name appears to have been given to two distinct birds The first of these is also known by the name 'Bob-o Link,' and scientifically as the *Emberiza oryzivora* of Wilson and Linnaeus This first form possesses the following as its specific characters—Tail feathers very acute, adult male in spring dress, black, the hind head yellowish white, scapulars, rump, and tail coverts white, tinged with ash, female young, and male in early autumn and winter dress, varied with brownish black and brownish yellow, beneath dull yellow, the male with much more yellow This bird migrates over the continent of America from Labrador to Mexico, and over the Great Antilles, appearing in the southern extremity of the United States about the middle of March or beginning of April About the first of May the Bob o' Links reach Massachusetts The rearing of their young takes place north of the fortieth degree of latitude Their food is insects and worms and the seeds of the

grassy meadows. In the autumn they sometimes attack the crops of oats and barley. The song of the male continues with little interruption as long as the female is sitting, and is singular and pleasant. The male generally loses his musical talent about the end of the first week in July, from which time, or somewhat earlier, his plumage begins to lose its gay colours, and to assume the humble hue of that of the female. About mid August they enter New York state and Pennsylvania in vast foraging parties on their way to the south. There, along the shores of the large rivers, lined with floating fields of wild rice, they find abundant subsistence, grow fat, and their flesh becomes little inferior in flavour to that of the European ortolan, on which account the reed or rice birds, as they are then called, are shot in great numbers. When the cool nights in October commence they move still farther south, till they reach the Islands of Cuba and Jamaica.

The first form is included in the *Conirostral* (*Insessores*, which see) group of the *Emberizine* or *Bunting*s, a division also including the *Ortolan*s (which see), &c.

The second species, known as the Rice hunting, is scientifically termed the *Oryzornis oryzivora*, and is also known under the designations of Java Sparrow, and Paddy or Paddy Bird. This bird is the *Loria oryzivora* of Linnaeus, and is included in the subfamily of *Fringillina* or True Finches, a group nearly allied to the *Bunting*s. The Java Sparrow possesses a largely developed bill. The general colour is a reddish or bluish lead, the hues and tints of the plumage being exceedingly difficult to describe. The head and tail are black, the belly rosy, the cheeks of the male white or snowy, and the legs flesh coloured. In Java this bird receives the name of *Glate*. It also occurs in Southern Asia, and is dreaded on account of the ravages it commits in the rice fields. It is frequently brought to Europe, and is found in aviaries. Its song is by no means characteristic or even attractive, but its plumage recommends it to the notice of bird fanciers. The Sumatran name of this bird is *Bomony Pepee*.

RICE GLUE. See *CHEMISTS*.

RICHARD I., King of England, surnamed *Cœur de Lion*, second son of Henry II by Eleanor of Guienne, was born at Oxford in 1157. In 1173 he was induced by his mother to unite with his brothers Henry and Geoffrey, and other confederates, in a rebellion against his father, which, however, that active prince soon quelled. This conduct he repeated on more than one occasion, until, in 1189, he openly joined the King of France, and in the war which ensued pursued the unhappy Henry from place to place, who, being at the same time deserted by his youngest son, died, worn out with chagrin and affliction, at Chinon, cursing his undutiful and ungrateful children with his latest breath. (See HENRY II.) On this event Richard succeeded to the throne of England, and, visiting his father's corpse the day after his decease, expressed great remorse at his own conduct. Having settled his affairs in France, he sailed to England, and was crowned at Westminster. He prudently gave his confidence to his father's ministers, and discountenanced all who had abetted his own rebellion. He had taken the cross previously to his accession, and now bent all his views to the gratification of his martial ardour in the fields of the East. He raised money by the sale of the crown property and offices, and by every other means he could devise, including the remission for a large sum of the vassalage imposed by his father upon Scotland. He then sought an interview with Philip of France, who had also taken the cross, in which mutual conditions respecting their joint operations were agreed

upon. A great number of English barons and others took the cross on this occasion, to which enterprise a massacre of the Jews in several of the principal towns of the kingdom formed a prelude. Before setting out he committed the government of his kingdom to William de Longchamp, bishop of Ely and chancellor of the kingdom, and the Bishop of Durham. It is unnecessary here to repeat the details of this expedition, which will be found in the article *CRUSADES*. In the course of this crusade he married the Princess Berengaria of Navarre in Cyprus. Richard quitted Palestine in 1192. He embarked at Acre in October, and sailed for the Adriatic, but was wrecked near Aquileia. Taking the disguise of a pilgrim, he pursued his way through Germany, until, being discovered near Vienna, he was arrested by the order of Leopold, duke of Austria, who, having received an affront from him in Palestine, seized this opportunity to gratify his avarice and revenge. The emperor, Henry VI, who had also a quarrel with Richard, hearing of his captivity, demanded him from Leopold, who gave him up on the stipulation of a portion of his ransom. While Richard was imprisoned his brother John had taken up arms in England in concert with the King of France. Richard bore his misfortunes with constancy, and when the emperor charged him before the Diet of Worms with various imaginary offences, he refuted these accusations with so much spirit that the assembly loudly exclaimed against his detention. At length a treaty was concluded for his liberation on the payment of a ransom of 150,000 marks, a sufficient instalment of which having been paid, Richard obtained his liberty. Richard embarked at the mouth of the Scheldt, and safely reached England in March, 1194, to the great joy of his subjects. After being recrowned in England he proceeded to France, where he was met by his brother John, who threw himself at his feet, and, through the mediation of his mother, entreated for forgiveness. 'I forgive him,' said Richard, 'and I hope I shall as easily forget his injuries as he will my pardon.' In the ensuing war with Philip Richard gained some advantages, but a truce soon suspended their hostilities. The emperor afterwards offered to remit the remainder of his ransom provided he would join him in an offensive alliance against France, which was readily agreed to. England during this period of useless contention, partly through the rapacity of government, and partly through unpropitious seasons productive of famine and pestilence, was in a state of great depression. A lasting accommodation with France was in agitation preparatory to another crusade, when the life and reign of Richard were suddenly brought to a close. A considerable treasure having been found in the land of the Viscount of Limoges, he sent part of it to Richard as his feudal sovereign. The latter, however, demanded the whole, which being refused, he invested the castle of Chalus, where the treasure was concealed, but was fatally wounded during the siege. The castle being taken before his death, he is said to have ordered the whole of the garrison to be put to death, except the man who shot the arrow by which he was wounded. Richard died of his wound on the 6th (according to others the 8th) of April, 1199, in the forty second year of his age and tenth of his reign, leaving no issue. The character of this king was strongly marked. He was the bravest among the brave, often frank and liberal, and not devoid of generosity. At the same time he was haughty, violent, unjust, rapacious, and sanguinary, and, to use the expression of Gibbon, united the ferocity of a gladiator to the cruelty of a tyrant. His talents were considerable both in the cabinet and in the field, and he was shrewd in observation,

eloquent, and very happy at sarcasm. He was also a poet, and some of his reputed compositions are preserved among those of the troubadours. On the whole a sort of romantic interest is attached to the character and exploits of this prince, which in the eye of reason they little merit, as the career of Richard produced calamities poorly atoned for by the military reputation which alone attended it.

RICHARD II, King of England, son of Edward the Black Prince, and grandson of Edward III, was born at Bordeaux, in 1366. He succeeded the latter in June, 1377, in his eleventh year, and was crowned on the 16th of July following. A Parliament met in October, and the Lords then appointed in the king's name nine persons to form a permanent council of the king. The earlier years of the king's minority passed in wars with France and Scotland, the expense of which led to exactions that produced the insurrection headed by Wat Tyler (1381). A hundred thousand insurgents are said to have marched to London, where, however, the rising was quelled chiefly through the address and presence of mind of the king. The insurgent leader having been killed in Smithfield by the hand of the Lord mayor of London, in the presence of the young king, whilst the rioters stood astonished at the fall of their leader the king calmly rode up to them, and declaring that he would be their leader, drew them off almost involuntarily into the neighbouring fields. In the meantime an armed force was collected by the lord mayor and others, at the sight of which the rioters fell down on their knees and demanded pardon, which was granted them on the condition of their immediate dispersion. Similar insurrections took place in various parts of the kingdom, all of which were, however, put down. The promise of conduct and capacity which he displayed on this emergency was but ill answered in the sequel, and he very early showed a predilection for weak and dissolute company, and the vicious indulgences so common to youthful royalty. In his sixteenth year (1382) he married Anne, daughter of the Emperor Charles IV, and soon after was so injudicious as to take the great seal from Scroop, on refusing to sanction certain extravagant grants of land to his courtiers. Wars with France and Scotland and the ambitious intrigues of the Duke of Lancaster one of his uncles, distracted some succeeding years. In addition to this the king had rendered himself obnoxious to the people by his extravagance and his trusting so much to favourites, the principal of whom were Michael de la Pole, Earl of Suffolk and chancellor, and Robert de Vere, Earl of Oxford, the latter of whom he created Duke of Ireland with entire sovereignty in that island for life. The Duke of Lancaster, being then absent, prosecuting his claim to the crown of Castile the king's younger uncle, the Duke of Gloucester, a prince of popular manners and unscrupulous ambition, became the leader of a formidable opposition, which procured an impeachment of the chancellor, and influenced the Parliament so far that it proceeded to strip the king of all authority, and obliged him to sign a commission appointing a council of regency for a year (1386). Being now in his twenty first year, this measure was very galling to Richard, who, in concert with the Duke of Ireland, found means to assemble a council of his friends at Nottingham, where the judges unanimously declared against the legality of the extorted commission (1387). Gloucester, after these proceedings, mustered an army in the vicinity of London, which being ineffectually opposed by a body of forces under the Duke of Ireland, several of the king's friends were executed. It may be mentioned here incidentally that it was during the reign of

Richard II that the battle of Otterbourne, the subject of a famous ballad bearing that title, was fought, on the 10th of August, 1388. A reaction in favour of Richard was soon produced by the tyranny of the ascendant party, so that, in 1389, Richard was encouraged to enter the council and in a resolute tone to declare that he was of full age to take the government into his own hands, and no opposition being ventured upon, he proceeded to turn out the Duke of Gloucester and all his adherents. This act he rendered palatable to the nation by publishing a general amnesty, and remitting the grants of money made by the late Parliament. Several years of internal tranquillity ensued which was promoted by the return of the Duke of Lancaster, whose influence formed a counterbalance to that of the Duke of Gloucester, and Richard prudently kept on the best terms with him. In 1394 Anne of Austria, 'the good Queen Anne,' as she was called by the people, died, and in 1396 Richard married Isabella of France. In 1397 the Duke of Gloucester, encouraged by the follies in which the king still continued to indulge, once more began to exercise his sinister influence, and the most criminal designs being imputed to him, Richard caused him and his two chief supporters, the Earls of Arundel and Warwick, to be arrested. The Earl of Arundel was executed, and the Earl of Warwick condemned to perpetual banishment. The Duke of Gloucester had been sent over to Calais for safe custody, and was there suffocated. A quarrel between the Duke of Hereford, son of John of Gaunt, and the Duke of Norfolk, was the incidental cause of the revolution which terminated this unsettled reign. The king banished both the dukes — Norfolk for life, and Hereford for ten, afterwards reduced to six years. It was, however, declared that each of them should be duly entitled to any inheritance which might fall to them during their absence, but on the death of John of Gaunt, in 1399, the unprincipled Richard seized his property as forfeited to the crown. The king having embarked for Ireland to revenge the death of his cousin, the Earl of March, who had been killed in a skirmish with the natives, Henry Bolingbroke, as the Duke of Hereford was now called, made use of this opportunity to land in Yorkshire with a small body of forces, and being joined by the Earls of Northumberland and Westmorland, and other influential leaders, proceeded southward, at the head of 60,000 men, nominally to recover his Duchy of Lancaster. When Richard, upon this intelligence, landed at Milford Haven, he found himself so much deserted that he withdrew to North Wales, with a design to escape to France. He was, however, decoyed to a conference with Henry, seized by an armed force, and led by his successful rival to London. As they entered the capital Henry was hailed with the loudest acclamations, and the unfortunate Richard treated with neglect and even contumely. His deposition was now resolved upon, to be preceded by a forced resignation of the crown. Thirty five articles of accusation were accordingly drawn up against him, of which several were exaggerated, false, and frivolous, but others contained real instances of tyranny and misgovernment and King Richard was solemnly deposed September 30, 1399. Henry then claimed the crown, which was awarded to him. (See HENRY IV.) Richard was committed for safe custody, to the Castle of Pomfret. Of the manner of his death no certain account has been given. It seems certain that he died a violent death, yet when his body (or what was said to be his body) was exposed (March 12, 1400), it showed no marks of outward violence. The fullest modern account of the reign is that in Wallon's Richard II (two vols, 1864).

RICHARD III. King of England, born at Fotheringhay Castle, in Northamptonshire, on Oct. 2, 1452, was the youngest son of Richard, duke of York. On the accession of his brother, Edward IV., he was created Duke of Gloucester, and during the early part of Edward's reign served him with great courage and fidelity. He partook of the ferocity which was ever a dark feature in the character of the Plantagenets, and is said to have personally aided in the murder of Edward prince of Wales, after the battle of Tewkesbury, and to have been the author, if not the perpetrator, of the murder of Henry VI. in the Tower. This bloody disposition was however, united in him with deep policy and dissimulation, which rendered him still more dangerous. He married in 1473 Anne, who had been betrothed to the murdered Prince of Wales, joint heiress of the Earl of Warwick, whose other daughter was united to the Duke of Clarence. Quarrels arose between the brothers on the division of the inheritance of their wives, and Richard, who found his elder brother an obstacle to his views of aggrandizement, combined in the accusations against that weak and versatile prince, which brought him to destruction. On the death of Edward, in 1483, the Duke of Gloucester was appointed protector of the kingdom, and he immediately caused his nephew, the young Edward V., to be declared king, and took an oath of fealty to him. The two ascendant factions, that of the queen's relatives, headed by her brother, Earl Rivers, and that of the more ancient nobility, who were led by the Duke of Buckingham and Lord Hastings, courted the favour of the protector, who dissimulated with each, while he was secretly pursuing the schemes of his own dark ambition. His first object was to get rid of those who were connected with the young king by blood, and after spending a convivial evening with Rivers, Grey, and Sir Thomas Vaughan, he had them arrested the next morning, and conveyed to Pontefract, where they were soon after executed without trial. Alarmed at the arrest of her relatives, the queen dowager took refuge in the sanctuary at Westminster, with her younger son, the Duke of York, and her daughter. As it was necessary for the protector's purposes to get both his nephews into his hands, he persuaded two prelates to urge the queen to deliver the Duke of York into his hands upon the most solemn assurances of safety. Lord Hastings, although opposed to the queen's relatives, being the steady friend of her children, was next arrested, while sitting in council, and led to immediate execution. After this bold and bloody commencement he proceeded in an attempt to establish the illegitimacy of Edward's children on the pretence of a previous marriage with the Lady Eleanor Talbot, daughter of the Earl of Shrewsbury, and scrupled not to countenance an attack on the character of his own mother, who was affirmed to have given other fathers to Edward and Clarence, and to have been true to her husband only in the birth of Richard. All these pleas were dwelt upon in a sermon preached at St Paul's Cross. The Duke of Buckingham afterwards, in a speech before the corporation and citizens of London, enlarged upon the title and virtues of the protector, and then ventured to ask them whether they chose the Duke of Gloucester for king. On their silence he repeated the question, and a few prepared voices exclaimed, "God save King Richard!" This was then accepted as the public voice, and Buckingham, with the lord mayor, repaired to the protector with a tender of the crown. He at first affected alarm and suspicion, and then pretended loyalty to his nephew, and unwillingness to take such a burden upon himself, but finally acceded, and he was proclaimed king on the 27th of June, 1483, the

mock election being secured by bodies of armed men, brought to the metropolis by himself and Buckingham. The deposed king and his brother were never more heard of, and according to general belief, they were smothered in the Tower of London, by order of their uncle. (See EDWARD V.) The new reign commenced with rewards to those who had been instrumental to the change, and with endeavours to obtain popularity. Richard, with a splendid retinue, made a progress through several provincial towns, and was crowned a second time at York, on which occasion he created his only son Prince of Wales. But hatred and abhorrence of Richard soon became the general sentiment of the nation, and all men's eyes were turned towards Henry, earl of Richmond, maternally descended from the Somerset branch of the house of Lancaster. Buckingham, not thinking himself adequately rewarded, entered into a conspiracy against him, with other malcontents in the south and west of England, but was suddenly deserted by his followers, betrayed into the hands of authority, and executed without trial. In August, 1485, Richmond landed with a small army at Milford Haven. Richard, not knowing in what quarter to expect him, was thrown into much perplexity, which was aggravated by his suspicion of the fidelity of his nobles, and especially the Stanleys, the chief of whom had become the second husband of Margaret, the Earl of Richmond's mother. When informed of the advance of his rival he, however, took the field with great expedition, and met him with an army of 15,000 men at Bosworth, in Leicestershire. Richmond had only 6000 men, but relied on the secret assurances of aid from Stanley, who commanded a separate force of 7000. The battle was fought on the 21st of August, 1485, and in the midst of it, Stanley, by falling on the flank of the royal army, secured the victory to Richmond. (See HENRY VII.) Richard, finding his situation desperate, rushed against his competitor, slew his standard bearer, and was on the point of encountering Richmond himself, when he sunk under the number of his assailants. The body of Richard was found in the field stripped naked, in which condition it was carried on a horse to Leicester, and interred in the Greyfriars Churchyard. Richard possessed courage, capacity, eloquence, and most of the talents which would have adorned a lawful throne. Many of his bad qualities have probably been exaggerated, but undeniable facts prove his cruelty, dissimulation, treachery, and relentless ambition. He has been represented as of small stature, deformed, and of a forbidding aspect. See I. Gardiner's History of the Life and Reign of Richard III. (1878), and Sir J. H. Ramsay's Lancaster and York: A Century of English History (1892).

RICHARD, Earl of Cornwall and Emperor of Germany between 1256 and 1272, during the so called interregnum, a son of King John of England, was born in 1209. In his youth he commanded with success the army of his brother Henry III. in France. In 1236 he took the cross and went to the Holy Land, but was not able to effect much in the East. He returned to London in 1242, and fought again against the French, but, notwithstanding, was deprived by his brother of his French domains (Guienne), and was threatened with imprisonment. In 1243 he married Sanchia of Provence. When, after the death of Conrad IV., no German prince would receive the imperial crown, and Pope Alexander IV. forbade the election of the young Conradin, of the house of Hohenstaufen, Richard was chosen emperor (1256) by the Archbishops of Cologne and Mainz and some other princes of the empire, while Treves, Bohemia, Saxony, &c., set up Alphonso X.

of Castile as anti-emperor Alphonso never came to Germany, whereas Richard made himself very popular there by spending large sums of money, and by other means, and accordingly was solemnly crowned with his wife at Aix la-Chapelle, 17th May, 1257. Although it is certain that he exercised all the rights of a German emperor historians have not admitted him into the series of German emperors, because his authority was respected only by those princes and nobles who derived some advantage from it. After his coronation he returned to London to rescue his brother from the hands of the English barons. In 1260 he returned to Germany, called a diet, and introduced some excellent measures, in 1262 he invested Ottokar of Bohemia with Styria, and at the same time confirmed the privileges of several imperial cities, such as Strasburg. The troubles in England recalled him to his native country in 1264. He was taken prisoner at the battle of Lewes, and did not obtain his freedom for fourteen months. In 1268 he again visited Germany, and next year held a diet at Worms, and published some excellent regulations with regard to the navigation of the Rhine. He died in England 2d April, 1272. He was one of the ablest, and also one of the richest, princes of his time, his wealth being chiefly obtained from the lead and tin mines of Cornwall.

RICHARD OF CIRENCESTER, a monkish chronicler of the fourteenth century. All that is known of his life is that he entered the Benedictine monastery of St Peter's Westminster, and was there in 1350, that in 1391 he obtained permission from his abbot to make a visit to Jerusalem, and that he died in his monastery in 1400 or 1401. He is the author of *Speculum Historiale de Gestis Regum Anglie*, a compilation from other chronicles, giving an account of the kings of England from 447 to 1066. Two other works now lost are also attributed to him. His name is best known, however, in connection with a forgery of the eighteenth century. In 1747 Charles Bertram, an English teacher in Copenhagen, wrote to the well known English antiquary, Dr Stukeley, that a friend of his had a manuscript work on Roman Britain by a monk named Richard of Westminster, and a transcript of the MS was subsequently forwarded, with a few lines in facsimile. The author was soon identified with Richard of Cirencester who henceforth passed for the writer of a valuable Latin treatise, *De Situ Britannia*. In 1766 Stukeley read before the Society of Antiquaries a paper giving an analysis of the work which next year was published at Copenhagen by Bertram himself, along with Richard's map, a commentary and also the remains of Gildas and Nennius. In 1809 the treatise was published in England, with an English version and a commentary the editor being H. Hatcher. A translation of it is included in Bohn's *Antiquarian Library* in the volume entitled *Six Old English Chronicles* (first published in 1818). In spite of this repeated republication and even of the facsimile specimen of the original MS its genuineness lately fell under the gravest suspicion, more especially as no one ever saw the original that Bertram professed to have discovered. The question will be found discussed in the *Gentleman's Magazine* for 1866 and 1867 by the late Mr Woodward, librarian at Windsor Castle, who came to the conclusion, now generally adopted, that it was simply a clever forgery. Many statements in otherwise valuable works regarding Roman Britain are quite erroneous, from being based on this work. See also the article on Bertram in the *Dictionary of National Biography*.

RICHARDSON, SIR JOHN, a distinguished naturalist and Arctic traveller, born at Dumfries, Nov

7, 1787, died near Grasmere, June 5, 1865. After studying medicine at the University of Edinburgh he entered the royal navy, in 1807, as assistant-surgeon. He served on various stations till 1819, when he was appointed surgeon and naturalist to the expedition sent out under Sir John Franklin to explore the region from Hudson's Bay to the mouth of the Coppermine River. In 1825 he set out with Franklin on his second expedition. In the summer of 1826 the explorers descended the Mackenzie River together down to the point where it separates into two branches, where Richardson was intrusted with the direction of one party, which was to take the eastern branch of the river and explore the coast as far east as the Coppermine River, while Franklin took the western branch. This task he performed in the most satisfactory manner. In 1824 Richardson had been appointed surgeon to the Royal Marines at Chatham, and on his return to England in 1827 he resumed his duties there. In 1838 he was appointed physician to the Haslar Hospital at Gosport and inspector of naval hospitals, and in 1846 was knighted. In March, 1848, he set out in company with Rae in search of Franklin, who had left England on a third expedition in May, 1845, but had not been heard of since the 26th of July of the same year. He again descended the Mackenzie, and then, taking the route eastwards along the coast of North America, reached with great difficulty Cape Hearne, whence, with still greater difficulty, he proceeded to Fort Confidence, at the head of the Great Bear Lake. He returned to England in 1849, after passing the winter in Fort Confidence. His expedition had been fruitless, so far as its main object was concerned, but had yielded him new and valuable materials for increasing the knowledge of the physical conditions of North America. In 1855 Richardson resigned his appointment at Haslar, and retired into private life. The last ten years of his life were spent chiefly in authorship and scientific pursuits. He also made during this period a visit to Italy. Richardson was the writer of the appendix on natural history to the narrative of Franklin's first expedition, and of that part of the narrative of the second expedition which gives an account of his own explorations on the coast of the Mackenzie River. To the splendid work bearing the title *Fauna Boreali Americana* he contributed the volumes on quadrupeds and fishes (i and iii), and was joint contributor to that on birds (ii). He also contributed the natural history sections to various works of travel besides those already mentioned, and was one of those who took part in the preparation of the *Museum of Natural History*. He also published *A Boat Voyage through Rupert's Land and the Arctic Sea* (Lond. 1851), containing an account of his expedition in search of Franklin, and *The Polar Regions* (1861).

RICHARDSON, SAMUEL, a distinguished English novelist, was born in 1689 in Derbyshire, and received only a common school education. He early discovered a talent for story telling and letter writing, and at the age of thirteen was the confidant of three young women in their love secrets, and employed by them in their amatory correspondence. At the age of sixteen Richardson was bound apprentice to Mr John Wilde, a printer of Stationers' Hall, London, and after the expiration of his apprenticeship passed five or six years as a foreman in a printing office, until at length he set up for himself. His diligence, accuracy, and honourable dealing acquired him an extensive business, and, beginning to thrive in the world, he married the daughter of another printer. The first part of his *Pamela*, the first work which gave him distinction as a writer, was published in 1740. So great was its popularity that it ran

through five editions in one year, and was even recommended from the pulpit. The novelty of his plan, with many passages of great beauty and interesting traits of character, may account for much of this reception, but even at that time critics existed who entertained those opinions of its imperfections, and doubts of its salutary tendency, which have since become almost general. He was led, by a spurious continuation, to add two volumes to his *Pamela*, which are inferior to the former but in 1747 the appearance of the first four volumes of his *Clarissa Harlowe* fully established his literary reputation, and its pathos, its variety of character, and minute development of the movements of the human heart, will cause it ever to be regarded as a noble monument of its author's genius. The History of Sir Charles Grandison appeared in 1753. The interest taken in this work was not equal to that produced by the former, although perhaps exhibiting more compass and invention, but the character of the hero is in some degree repulsive, and the prolixity of the author began to engender satiety. The character of *Clementina* is a masterly example of delicate delineation. This work was, as well as the preceding, translated into foreign languages, and received with great applause. Among the most enthusiastic of his French admirers were *Didrot* and *Rousseau*. In all the productions of Richardson the style is inelegant, gossiping, and verbose and he seldom knows when to leave off. In 1754 he rose to be master of the Stationers' Company, and in 1760 purchased a moiety of the patent of law printer to the king. As he grew rich he indulged himself with a country residence at *Parson's Green*, *Middlesex*, where he lived surrounded with a circle of affectionate admirers, particularly females, to whom it was his delight to read his works in the progress of composition. He died in 1761, and was buried in the church of *St Bride*, in *Fleet Street*. His correspondence was published in 1804 in six vols 8vo, with a life by *Mrs Barbauld*.

Richardson's manners were formal and retiring, arising from a very debilitated state of the nerves and a natural bashfulness, but he was in reality most generous and open hearted. He gave away a great deal of money in charity, and was so fond of inviting friends to stay with him that when they were ill he and his family must needs have them to be nursed, and several actually died at his house, as at an hospital for sick friends. He was twice married, and had six children by each wife, but only four daughters of the second marriage outlived him.

RICHELIEU, ARMAND JEAN DU PLESSIS, CARDINAL, DUC DE, one of the greatest statesmen of France, was born at Paris, according to *Jal*, who cites the register of his baptism, on the 9th, not, as usually stated, on the 5th of September, 1585, died at Paris on the 4th of December, 1642. He was the son of *François Duplessis*, seigneur de Richelieu in *Touraine* (now in the département of *Indre et Loire*). He was originally destined for the profession of arms, but his brother, *Alphonse*, having resigned the bishopric of *Luçon*, this was bestowed on him by *Henry IV* (1606). He obtained from the pope a dispensation allowing him to accept the office though under age, and on the 16th of April, 1607, was consecrated by the *Cardinal de Givry* in presence of the pope himself (*Paul V*). For several years he devoted himself to the duties of his see, reforming abuses, and labouring for the conversion of Protestants. But his ambition always made him turn his eyes towards the court, and having come to Paris in 1614 as deputy of the clergy of *Portou* to the *States general* he managed to insinuate himself into the favour of the queen-mother, who obtained for him the post of grand

almoner, and in 1616 that of secretary of state for war and foreign affairs. On the disgrace of the queen-mother (1617) Richelieu fell with her, and was banished first to *Blois* and then to *Avignon*. In 1620 he managed to effect a reconciliation between *Mary of Medici* and her son *Louis XIII*, but this reconciliation was not well cemented till after the death of the king's favourite, the *Constable de Luynes*, whom *Mary* detested (1621). The restoration of the influence of the queen mother restored his own fortunes. On the 5th of September he obtained through her influence the cardinal's hat, and on the 19th of April, 1624, was admitted into the council of state. From this date he was at the head of affairs. No sooner was Richelieu seated in his high post than he began systematically to extend the power of the crown by crushing the *Huguenots*, overthrowing the privileges of the great vassals, and to increase the influence of the French monarchy by undermining that of the *Hapsburgs*, both beyond the *Pyrenees* and in *Germany*. *Louis XIII*, who was sensible of the energy of his minister, favoured his plans, while he always showed a dislike for the man, whom he would gladly have destroyed had he been able to govern without him. The *Huguenots*, or French Protestants, had for a long time resisted the royal power, and bloody insurrections, in several preceding reigns, had arisen from their struggles with the spiritual and temporal authorities in defence of their civil rights and freedom of conscience. The wisdom and mildness of *Henry IV* had assuaged the excitement of the contending parties, but his reign was too short to extinguish the fires which still glowed beneath the embers. The struggle for religious freedom was too often indeed made a pretext by the nobles, and even the princes of the blood royal, to cloak and further their own ambitious designs, and both religious parties, Catholics as well as Protestants, had thus alternately served as a check upon the despotic exercise of the royal power. Richelieu therefore resolved to crush the weaker by the aid of the stronger party, and thus to deprive those who should be disposed to resist his schemes of their main prop. By the *Edict of Nantes* the *Huguenots* had been placed on nearly the same footing with the other subjects of the kingdom there were some provinces in which they had the ascendancy, and their armed force was sufficient to shake the throne should they be excited to rise against it. Their rallying point was *Rochelle*, and Richelieu neglected no means to make himself master of that city. In the celebrated siege of *Rochelle* he commanded the army in person. The attack and defence of the place are considered as affording models of perseverance, valour, and military skill. *Rochelle*, supported by England, from which it continually received supplies, held out for a long time against all the efforts of the cardinal, and the hope of reducing it was already nearly abandoned, when Richelieu, by the erection of an immense mole, cut off the communication by sea, and finally compelled it to surrender by famine (October 29, 1628). It would be a mistake to see in this war that Richelieu waged against the *Huguenots* an example of religious intolerance, for although this would have been quite in keeping with the spirit of his time, Richelieu was, with respect to this matter of religious toleration, in advance of his age. He destroyed the political consequence of the *Huguenots* as a separate body within the state, but by the *Peace of Alais* or *Edict of Grace*, which concluded the war (June, 1629), he left them liberty of worship and equality of civil rights, and throughout his ministry he employed them, along with other citizens, in the army, the magistracy, and offices connected with the revenue. During the continuance of this war Richelieu

had taken various steps in pursuance of the other main end of his internal policy, the overthrow of the power of the great nobles. In 1628 he ordered the demolition of all those feudal fortresses which could not be used for the defence of the frontiers, and which were a perpetual menace to the crown, an object of terror to the neighbouring towns and country districts, and a memorial to the nobles of their ancient power. In the same year he abolished the offices of grand admiral and constable, which gave to the holders of them an almost royal authority over the fleet and the army. For the office of grand admiral he substituted that of grand master and general superintendent of navigation and commerce, with which he got himself invested, although he accepted no salary for it.

The next step of Richelieu, after the suppression of the Huguenots, was the removal of the queen-mother from court. It was to her that Richelieu owed his elevation, but when she discovered that instead of becoming merely her instrument he was only bent on pursuing great schemes of state and aimed at the humbling of the house of Austria to which she adhered her favour was changed to hatred and she endeavoured to effect his fall. She had already gained over the king to her purpose in a secret interview, when Richelieu entered the cabinet the queen overwhelmed him with reproaches. He continued calm and requested the king's permission to leave the court. The preparations were already made for his departure, but the king who was not less offended by the violence of the queen than pleased by the respectful demeanour of the cardinal, asked the advice of his favourite St Simon. The latter represented to him the services of Richelieu and the impossibility of dispensing with his aid. Louis, therefore, ordered him to Versailles and assigned him apartments in the palace directly below his own. This day (November 10 1630) on which the hopes of the queen and of the cardinal's enemies were disappointed was called the 'Day of the Dupes' (*la Journée des Dupes*). The queen-mother was banished to Compiègne, her friends were removed from place and some of them thrown into the Bastille. This step and the almost total annihilation of the privileges of the parliaments and the clergy excited all classes against the despotic administration of the cardinal, and the discontent broke out in numerous risings and conspiracies which however were not only suppressed by the prudence and vigour of his measures but also contributed to the furtherance of his plans, and gradually rendered the royal power entirely absolute. In 1632 the royal arms directed by Richelieu (who had in the previous year been raised to the rank of duke) suppressed the rising in favour of the Duke of Orleans the king's brother to which the Duke of Montmorency had been induced to lend his support. Montmorency having been captured was tried and condemned by the parliament of Toulouse and the sentence was executed, in spite of the intercessions of all the nobility, of whom he himself was the first. Equally unsuccessful were the attempts of the Dukes of Lorraine, Guise, Bouillon &c. even those whom the king privately favoured were obliged to yield to the all-powerful minister, and paid with their lives for their rashness in venturing to oppose him as in the instance of Cinq Mars who in 1642, a short time before Richelieu's death, had entered into a conspiracy against him, which the king was not without reason, believed to have favoured. While the minister was thus extending the power of the crown at home he did not neglect the aggrandizement of the monarchy abroad. The Thirty Years' war gave him an opportunity of effecting this object

The same man who persecuted, with the greatest severity, the Protestants in France, employed all the arts of negotiation, and even force of arms, to protect the same sect in Germany, for the purpose of humbling the house of Austria. In the early stages of the war he subsidized the Count of Mansfeld. Subsequently Gustavus Adolphus, king of Sweden, the great bulwark of religious liberty in Germany, received aid of every kind from Richelieu as long as he was not in danger of becoming formidable to France, but when the brilliant victories of Gustavus gave the cardinal reason to consider his power as more dangerous than that of Austria he abandoned that prince in the midst of his successes. The war which he undertook against Spain, and which continued till 1659 put France in possession of Catalonia and Roussillon and the separation of Portugal from Spain was effected by his assistance (1640). He also endeavoured to weaken the Austrian influence in Italy and procured the transfer of the Duchy of Mantua to the Duke of Nevers. (See MANITIA.) The Duke de Richelieu must be allowed to have deserved the character of a great statesman: he cannot be denied the glory of having raised the power of the sovereign in France to its highest pitch, but he was proud, arrogant and vindictive. He was a patron of letters and art and founder of the French Academy and the Jardin des Plantes. Louis XIII died a few months after him, but in the long reign of Louis XIV. the effects of Richelieu's policy were yet visible. Richelieu was the author of *Mémoires* relating to the years 1632-35, *Maximes d'Etat ou Testament Politique* du Cardinal de Richelieu, and *Journal du Cardinal de Richelieu* See Hanotaux's *Histoire du Cardinal de Richelieu* (1893-96). D'Avenel's *Richelieu et la Monarchie Absolue* (1884-90). Lodge's *Richelieu* (1896), and Zeller's *Louis XIII, Marie de Médicis, Richelieu* (1899).

RICHMOND, an ancient municipal borough and town of England in the county and 42 miles north-west of York (North Riding) on the left bank of the Swale which is here crossed by a handsome stone bridge. It is picturesquely situated neat and well built. It has a handsome town hall two old and interesting churches, several other places of worship, including a Roman Catholic chapel, a free grammar school incorporated under Queen Elizabeth, various other schools, hospitals, charitable institutions, &c. In and around the town are numerous interesting remains of antiquity, the most remarkable of which is the castle comprising an area of nearly 6 acres, and one of the most majestic ruins in England, its great tower about 100 feet high is a fine and very perfect specimen of the Norman keep. Richmond latterly returned one member to Parliament, and since 1885 has given name to a parliamentary division. Races are annually held near the town. Pop in 1891 1216 in 1901 3836.

RICHMOND a municipal borough of England, in the county of Surrey, 12 miles W.S.W. of London, with which it is connected by railway, partly on an acclivity of Richmond Hill, and partly on a plain along the Thames, which is here crossed by a handsome stone bridge of five arches connecting it with Twickenham. Of the churches the most notable are that of St Matthias, built from designs by Sir G. G. Scott in 1858 and that of St Mary Magdalen, with monuments and memorials of various persons of note. There is a handsome town hall (1893), fine library, public baths, well endowed almshouses, Royal Hospital &c. Richmond has no manufactures, if the celebrated cakes, called 'Maid of Honour', be excepted, of which large quantities are made for the numerous visitors who throng thither during the

summer season The scenery in the vicinity is very beautiful, and the view from Richmond is one of the finest to be obtained anywhere, its interest is not a little heightened by the great number of noblemen and gentlemen's seats which present themselves in all directions. Richmond was a favourite residence for many centuries of the monarchs of England, several of whom died there The royal park formed by Charles I is inclosed by a wall 8 miles long Pop (1881), 19,065, (1891), 26,875, (1901), 31,677

RICHMOND, a city of the United States, capital of Virginia, is situated on the north side of James River, at the head of tide water, 100 miles s.w. of Washington The streets are generally wide and mostly intersect each other at right angles The surface of the city is uneven, the central district is flat and traversed by Shockoe Creek, from which on both sides are easy ascents to elevated hills and plateaus From points overlooking the river very picturesque views of the adjacent country are obtained Near the business centre is the Capitol Square, a beautiful park of 12 acres, in the middle of which is the State House or Capitol, modelled after that monument of antiquity, the Maison Carrée at Nîmes, France In this building is Houdon's celebrated marble statue of Washington In the Capitol grounds are Crawford's magnificent Washington monument, surmounted by a bronze statue of the Pater Patriæ, Foley's bronze statue of General T. J. (Stonewall) Jackson, erected by Englishmen, Hart's statue of Henry Clay and the new State Library (75,000 vols) In 1890 an equestrian statue of General Lee was erected in the west of the city Near the Capitol is the governor's mansion, and to the north is a splendid city hall On the south is the imposing Federal Buildings, constructed of granite, occupied as the post office and by various officials of the national government These edifices together with numerous churches, colleges, public school buildings, asylums, hotels, places of amusement, and elegant and costly private residences, impart a diversified and impressive architectural excellence to the city There are several public parks in addition to the Capitol Square Hollywood cemetery is noted for its solemn grandeur and natural beauty The gas and water works are owned by the corporation The water power from the falls of the river is almost unlimited, and the various mills and factories give employment to numerous workmen The trade staples are tobacco, iron, grain and flour—the sales averaging \$30,000,000 (£6,000,000) per annum The river is navigable to the wharves for vessels drawing 14 feet Several lines of railway diverge from the city, and steamers ply regularly to Baltimore, Philadelphia, and New York Manchester on the opposite side of the river, and connected with Richmond by several substantial bridges, is a thriving town of 9000 inhabitants—Richmond was formally founded in 1742, and became the seat of government in 1779 During the Civil war it became the capital of the Confederate states, was invested by the Federal armies, and after sanguinary fighting and a remarkable defence for nearly a year by General Lee, was evacuated on April 3, 1865 Pop (1880), 63,600, (1890), 81,388, (1900), 85,000

RICHMOND, a city of the United States, in Indiana, on the east fork of the Whitewater, and at the junction of several important lines of railway, 69 miles east of Indianapolis It is a flourishing place, with a large number of mills and factories, and an extensive trade in agricultural produce Pop (1880), 12,742, (1890), 16,608

RICHTER, JOHANN PAUL FRIEDRICH, commonly called JEAN PAUL, a celebrated German writer, was born March 21, 1763, at Wunsiedel, in the Richte-

gebirge, and died November 14, 1825, at Baireuth His father was, at the time of his birth, a teacher and organist at Wunsiedel, at a later period pastor at Schwarzenbach on the Saale In 1781 Richter entered the University of Leipzig in order to study theology, but soon changed his plan, and devoted himself to literature In 1784 he was forced by poverty to leave Leipzig, upon which he went to Hof, where his mother was living in very poor circumstances In 1787-89 he was a private tutor at Töpen, a village distant several leagues from Hof, and in 1790-94 he taught the children of several families at Schwarzenbach In the meantime he had appeared as an author, having published his *Gronlandsche Prozesse* (Berlin, 1783-84), *Auswahl aus des Teufels Papieren* (Gera, 1789), and *Die unsichtbare Loge* (Berlin, 1793), the first two were anonymous Having given up his teaching at Schwarzenbach he again resided at Hof, and from time to time at Baireuth with a friend He now published a number of works in rapid succession, so that his name was one of the best known in Germany, when on the death of his mother, he took up his residence at Leipzig in the autumn of 1797 Love for Herder took him the following year to Weimar, which in 1800 he exchanged for Berlin, leaving this soon after for Meiningen, Meiningen for Coburg (1803), and Coburg for Baireuth (1804), where he finally settled He had received the title of counsellor of legation from the Duke of Saxe-Hildburghausen, and he received from the prince primate (Halberg) a pension, which the king of Bavaria continued after Baireuth had fallen to him During his stay at Berlin he had married Karoline Mayer, the daughter of a privy councillor, a union which proved very happy Secured by his pension from want, happy in his domestic relations blessed with numerous friends, and an almost childlike amableness, having millions of admirers, unambitious of vain distinctions or objects beyond his reach, with a heart susceptible of the noblest emotions, believing in man's goodness, and firmly relying on the immortality of the soul—he may be said to have been one of the happiest men that ever trod this earth His last years were saddened by the death of his only son, who died in 1821 It would be difficult to give a distinct idea of Jean Paul's works (this was the name under which he wrote) in a brief sketch like ours Jean Paul is a humorous writer, but his humour is of a peculiar sort, being deeply reflective and philosophic, at the same time often truly comic He frequently rises to the highest regions, where he can speak only in bold metaphors, and before we are aware, we hear his inspiring tones die away like those of a lark when the bird has come again to the ground If it can be said of any man's writings that they are poetry in a prose form, it is true of many passages in Jean Paul's works His writings are generally in the form of novels, but they have little of the character of what we generally understand by novels He seems to have liked particularly to analyze emotions, to dissect individual character in every station even the humblest He does not exhibit man under those general influences which operate on large masses of men, but deals almost exclusively with the individual considered as such His first work, *Greenland Lawsuits*, was satirical rather than humorous, and neither it nor his *Auswahl aus des Teufels Papieren* (Selection from the Devil's Papers) caused much sensation in the reading world His first novel, titled *Die unsichtbare Loge* (The Invisible Lodge) appeared in 1793 It was followed by *Hesperus* (1794), *Biographische Belustigungen unter der Gehirnschale einer Riesin* (Biographical Recreations under the Skull of a Giantess, 1796), *Leben des Quintus Fixlein* (1796), *Blumen, Frucht und Dornenstücke*

(Flower, Fruit, and Thorn Pieces, 1796), Der Jubel-senior (Parson in Jubilee, 1797), Das Kampaner Thal (1797), Titan (1800), Flegeljahre (translated by Carlyle 'Wild Oats,' 1804). The two last works are regarded as among his best productions. Das heimliche Klaglied der jetzigen Manner appeared in 1801, Dr Katzenberger's Badereise (1809), Des Feldprediger's Schmelze Reise nach Flatz (1809), Leben Fibels (1812), Der Komet, oder Nicolaus Marggraf (1820-22). Die Vorschule der Aesthetik, his first important philosophical work, appeared in 1804. It was followed by Levana, oder Erziehungsalchre (1807), a work on education. His Friedenspredigt appeared in 1808, Dämmerungen für Deutschland (1809), Mars und Phobus' Thronwechsel im Jahr 1814 (1814), Polit Fastenpredigten (1817). A collection of his works, Sammtliche Werke, edited by him before his death, was published in Berlin in sixty-five volumes (1826-38). Der Papierradche, his last work, was published in 1845. See Spavler's Jean Paul Friedrich Richter, ein biographischer Commentar zu dessen Werken (five vols., Leipzig, 1833), and Carlyle's two essays on Richter.

RICINUS COMMUNIS See CASTOR OII.

RICKETS, or **ENGLISH DYSPE**, an affection of the general nutrition of the whole body, dependent chiefly upon improper feeding and want of fresh air and exercise, which commonly appears after the age of nine months and before that of two years, producing its most obvious effects on the growth of the bones. The disease is known by a large head, prominent forehead, projecting breast bone, flattened ribs, big belly, and emaciated limbs, with great debility. The bones and spine of the back are variously distorted. Nature frequently restores the general health, and leaves the limbs distorted. In the treatment of rickets tonic medicines, the cold bath, &c., are beneficial. The child should be kept clean and dry, regularly exercised, and allowed to enjoy a pure bracing air, the air of the seaside being specially beneficial. The food should be nutritious and easy of digestion.

RICOCHET See RANGF.

RIDDLE, any sentence or composition with a double or veiled meaning, which is propounded with a view to the discovery of that meaning, which is designedly obscured by the terms of the riddle. A riddle may either have an apparent sense which serves as a disguise to the real one, or it may be in the form of a question the terms of which do not directly indicate the nature of the answer required. Riddles naturally divide themselves into two classes: plays upon words, which are otherwise called *conundrums* and allegorical or fanciful descriptions of or allusions to the subject on which the riddle is founded. The latter is called an *enigma*. It is the more ancient and serious form of the riddle. Enigmas, or dark sayings, were frequently used by the ancients to disguise important truths, which it was not deemed safe or advisable that every one should know. Kings sent enigmas to each other, ambassadors delivered their messages in this form, and the oracles of the gods were frequently conveyed in the form of an *enigma*. In modern times serious enigmas have been elaborated in prose and verse, particularly the latter, in all civilized languages. They are in general mere elaborate trifling, and are commonly as dull as they deserve to be.

Among the most celebrated examples of ancient riddles is that propounded by the Sphinx, and answered by Oedipus, What animal is that which goes on four feet in the morning, on two at mid day, and on three in the evening? The answer is, Man, because he goes on all fours as a child, on two feet as a young man, and with a staff in old age.

This is a fairer riddle than the equally celebrated one of Samson, which referred to a personal event in his own history, with which those to whom it was propounded were not supposed to be acquainted. In modern riddles it is usually held indispensable that the question should contain the conditions of the answer, however much they may be obscured by the ingenuity of the propounder, but in the ancient riddle, which was a more serious affair, it seems to have been allowable to tax the knowledge and ingenuity of the finder with the most recondite secrets of nature and the utmost obscurities of language. The following is said to have been propounded by a king of Egypt to a king of Babylon, and solved on behalf of the latter by Esop, but much as we respect the sagacity of the renowned fabulist we do not vouch for the truth of the story. 'There is a great temple supported by a single column, the column is surrounded by twelve towns, each of these has thirty buttresses, and beside each buttress are two women, one white and the other black, who measure its circumference. What is this temple?' The temple is the world, the column the year, the twelve towns the months, the thirty buttresses the days, the two women day and night.

The punning variety of riddle, though sometimes indulged in by the Greeks and Romans, is comparatively of modern growth. It is a great favourite in festive gatherings of juveniles. Sometimes strings of puns are linked together with considerable ingenuity in the more complex riddles of this description, as in the following instance. What wind does a hungry sailor like best? One that blows fowl and chops, and then comes in little puffs. The earliest collection of riddles known to have been published in this country, entitled Demands Joyous, printed in 1511, is noticed in Chambers' Book of Days, vol. i p. 332. From the specimens given the riddles in this collection seem to have been somewhat heavy, and would scarcely excite much joy in the juvenile mind now a days. On an average estimate it would take about twenty-four conundrums of the quality represented to provoke a smile. The following is a favourable specimen—'What bare the best burden that ever was borne? The ass that carried our Lady when she fled with our Lord into Egypt. What became of that ass? Adam's mother ate her. Who was Adam's mother? The earth. One of the conundrums of the Demands Joyous is curious as a sort of anticipation of Lord Dunsinore. Why do men make an oven in a town? Because they cannot make a town in an oven. Others are interesting as showing how witless questions do well up spontaneously from age to age, as, How many calves tails would it take to reach from the earth to the sky? No more than one if it be long enough. The first French collection was published in Paris by Gille Beys in 1582, under the title (*Enigmes Françaises* d'Alexandre Sylvain avec les expositions d'icelles Ensemble quelques enigmes espagnoles dudit autheur et d'autres. It seems to have been of equal merit with its English precursor. A committee of Oedipuses, we are informed, could have made no head against the riddles propounded in it, and the ordinary reader, when kindly taken into the confidence of the propounder, finds the *expositions d'icelles* even more bewildering than the riddles themselves. *Nous avons changé tout cela*, the modern riddler, though less imaginative than his ancient prototype, is responsible under strict penalties for the production of a passable pun.

RIDING See HORSEMANSHIP.

RIDING MASTER, ARMY, an officer in the cavalry whose duty it is to instruct the officers and men in the art of riding. He is generally selected from the ranks, bears the rank of lieutenant, and is

retired with a pension, and the rank of captain, at the age of fifty five, or on completing 10, 15, or 20 years' service as such

RIDINGS (that is, third parts), the three great divisions of the county of York, called respectively the North, East, and West.

RIDLEY, NICHOLAS, Bishop of London in the reigns of Edward VI. and his successor Mary, was born about the commencement of the sixteenth century, and educated at Cambridge. He travelled on the Continent, and during a three years' absence from his native country became acquainted with several of the early reformers, whose doctrines he afterwards warmly espoused. Returning to Cambridge, he filled the office of proctor to the university, and as such protested against the claims of the Papal see to the supreme ecclesiastical jurisdiction in the realm. He was also chosen public orator, and, through the patronage of Archbishop Cranmer, became one of the king's chaplains, and in 1547 he was elevated to the see of Rochester. In 1550, on the deprivation of Bonner, Ridley was made Bishop of London, and distinguished himself by his tempered zeal in favour of the Protestant Church, and especially by his liberality and kindness towards the family of his predecessor. On the death of Edward a dread of the succession of a Roman Catholic sovereign induced him to listen to those who made an attempt to secure the Protestant ascendancy by placing the Lady Jane Grey upon the throne. The defeat of this scheme, the active part he had taken in the establishment of the new discipline and the construction of the liturgy, together with his connection with Cranmer, marked Ridley out as one of the most prominent victims of Papal authority. The form of a trial was indeed granted him, a deputation of Roman Catholic bishops was appointed to hold a formal disputation on the controverted points with him at Oxford, and he was condemned as a recusant and obstinate heretic to the stake. This sentence he underwent with the greatest fortitude, in company with his friend and fellow sufferer Latimer, Oct. 16, 1555, in Oxford. See memoir in Moyle's edition of Ridley's Declaration of the Lord's Supper (1895).

RIEMANN, GEORG FRIEDRICH BERNHARD, German mathematician, born in 1826, died in 1866. He was educated at Hanover, Luneburg, Göttingen, and Berlin, taking his doctor's degree at Göttingen in 1851. He had already greatly distinguished himself in mathematics, and his thesis for the doctorate was a memoir on a general theory of the functions of a complex variable, which excited the admiration of the veteran mathematician Gauss. He became professor extraordinary and then full professor at Göttingen (in 1859), and by this time had a well established reputation. His writings though brief are full of original methods and profound ideas.

RIENZI, COLA DI, a native of Rome, who, in the fourteenth century, became celebrated for his attempts to restore the Roman Republic. Although the son of one of the lowest order of tavern keepers, he received a literary education, and early distinguished himself by his talents, parts, and elevated sentiments. The glory of ancient Rome excited his enthusiasm, and he came to be regarded by the common people as an extraordinary person destined to rescue them from the tyranny of the aristocracy, which, on the removal of the popes to Avignon, had become in the highest degree insolent and oppressive. In 1342 he was joined with Petrarch in a deputation to Pope Clement VI at Avignon to exhort him to bring back the Papal court to its original seat. He acted on this occasion with so much energy and eloquence that the pope created him an apostolic notary, which office, on his return, he executed with strict probity.

VOL. XL

He let no opportunity escape to excite the discontent of the people by haranguing against the nobility and the defects of the public administration. Having prepared men's minds for a change, and engaged persons of all orders in his designs, in the month of April, 1347, during the absence of the governor of Rome, Stefano Colonna, he summoned a secret assembly upon Mount Aventine, before which he made an energetic speech, and induced them all to subscribe an oath for the establishment of a plan of government, which he entitled the *good estate*. He had even the address to gain over the pope's vicar, and in a second assembly in the capitol produced fifteen articles as the basis of the good estate, which were unanimously approved, and the people conferred upon him the title of tribune, with the power of life and death, and all the other attributes of sovereignty. The governor, Colonna, upon his return, threatened him with punishment, but was himself compelled to quit the city, and Rienzi banished several of the noble families, after capitally punishing such as were convicted of oppression and injustice. In the first exercise of his authority he conducted himself with a strict regard to justice and the public good, and even the pope was induced to sanction his power. The reputation of the new tribune extended throughout Italy, and his friendship was even solicited by the King of Hungary and the Emperor Louis. Petrarch was highly interested in his proceedings, and there are extant several eloquent letters in which that poet exhorts him to persevere in his glorious undertakings. But the intoxication of supreme power began to betray him into extravagances. He caused himself to be created a knight, with a mixture of religious and military ceremonies, and cited the two rival emperors, Charles and Louis, to appear before him to justify their pretensions. He also dismissed the pope's legate, and, reducing the nobles into complete humiliation, commenced a reign of terror. But at length, finding that he had lost the affection and confidence of the people, he withdrew in 1348 from Rome, and remained in Naples until 1350, when he took advantage of the jubilee to return secretly to Rome, but being discovered, he withdrew to Prague. Thence he came into the hands of Pope Clement at Avignon, who confined him three years, and appointed a commission to try him. His successor, Innocent VI., released Rienzi, and sent him to Rome as governor to oppose another popular demagogue named Boroncelli. The Romans received him with great demonstrations of joy, and he recovered his former authority, but after a turbulent administration of a few months the nobles excited another sedition against him, in which he was massacred, in October, 1354. His last brief career had been marked with great cruelty, which excited the populace to treat his remains with indignity. Rienzi, who possessed a union of fanaticism and artifice, was more energetic in speech and council than in action, and failed in courage and presence of mind in great emergencies.

RIESENBERGIRGE (the Giants' Mountains), part of the Sudetic chain, separating Silesia from Bohemia and Moravia, till it joins the Carpathians, but the term is properly applied to that part of this range which lies between the sources of the Neisse and the Bober. It contains the loftiest mountains of the north or central parts of Germany. Some of the principal summits are Schneekoppe, 5257 feet high, the Borenberg and the Grand Rad, each 5156 feet high. The valleys of the Riesengebirge present many picturesque scenes.

RILTI, a town in Italy, capital of the district of same name, in the province of Perugia, in a beautiful district on the Velino, 42 miles N N E. of Rome. It

is the see of a bishop, has a court of law and several public offices, manufactures of woollen stuffs, and mineral springs. Wood is much cultivated in the vicinity. Pop 12 000

RIFLÉ, or **EL RIFLÉ**, a district on the north coast of Morocco (which see)

RIFLE, a musket with a rifled or spirally grooved bore giving rotation to its bullets. Under the article **GUNFIRE** are explained the advantages of imparting a spin to a bullet. Under **MUSKET** some facts and dates of the earlier and modern rifles are given. The theoretical advantages of firearms of diminutive calibres throwing elongated bullets have been long known. The chief practical obstacle to their introduction was that their grooves got clogged up with lead, so that after some firing the bullet failed to rotate. Also, the long soft lead bullets got 'set up' and distorted by the shock of discharge. Latterly in 1883, the Swiss Major Rulien placed the lead bullet in a thin cupro-nickel envelope. This compound bullet takes the rifling easily, and with out much metallic fouling of the grooves. It is now universally adopted for military purposes. There is a tendency to adopt it with an exposed hollow head, for sporting purposes, so that in striking large game it flattens out to the form of a mushroom, and thus causes fatal wounds. The saving in weight and cubic space in packing effected through the introduction of the present small calibre rifle is shown by the fact that the same ammunition box contains 660 rounds Martini Henry and 1100 rounds Lee Metford, the weight of the ammunition being 66 lbs approximately.

The power of a bullet to overcome the resistance of the air is directly proportional to the ratio $\frac{w}{d^2}$ called the *sectional density* where w is the weight in lbs and d the diameter in inches. The weights of the Snider, Martini Henry, and Lee Metford bullets are 480 450 and 215 grains and the diameters 573 45 and 303 mch respectively. Hence, by arithmetic, their sectional densities are in the ratios of 202, 328 and 325, which values enable us to compare their ranging powers when moving with the same velocity. A copper bullet meets with the same resistance of air as a lead one of same form and dimensions and velocity, but the retardation ($\propto \frac{d^2}{w}$) or the rate

at which a bullet loses velocity owing to the resistance of the air will be greater with the copper bullet. Sporting 'express' bullets are lightened out to obtain high muzzle velocity and consequently trajectories approximating to a straight line, at ranges of 100 to 150 yards. At long ranges their low sectional densities cause an undue loss of velocity, and consequently heights of trajectory varying considerably for different ranges which adds to the chance of missing the target if the range is not known fairly accurately.

The recoil of a small arm is practically limited by the blow which a man can repeatedly bear on his shoulder without affecting his aim. Since action and reaction are equal and opposite, so long as the bullet is in the bore, at any instant the forward momentum of the bullet equals the backward momentum of the rifle. If w and v be the weights of rifle and bullet in lbs respectively and u and v be their velocities in feet seconds at any instant then $wu = wv$. Thus it is seen that the shock of recoil is measured by the momentum of the bullet—that is by wv —which may be compounded of high speed and low weight, or low speed and high weight. The muzzle velocities of the Lee-Metford (L M) and the

Martini Henry (M H) bullets are 2000 and 1315 feet seconds respectively, hence, by arithmetic, the ratio of their momenta is about as 2 to 3. The formula also shows that an increase of weight of rifle decreases the velocity of its recoil. The bullet takes an appreciable time in its passage up the bore, varying with the degree of rapidity of the burning of the powder, hence it is obvious the latter also influences the shock of recoil.

The breech mechanism of a rifle is designed to perform the functions of (1) extracting the fired cartridge case, ejecting it to the side, and not directly to the rear against the holder, (2) leaving in prolongation of the chamber a clear space for the new cartridge, (3) putting in action or cocking the firing pin or striker, (4) pushing the new cartridge into the chamber, (5) closing its breech end, (6) firing the detonating cap of the cartridge, (7) unloading and locking the action. With a magazine or repeating rifle there is a semi-automatic arrangement for a continuous feed of from five to ten cartridges.

The mechanism falls under (a) the block and (b) the bolt systems. The Martini Henry (see Plate) furnishes an example of the former. Its breech is closed by a block c hinged on a pin, this block contains a direct acting piston or striker (2), which a spiral spring (3) actuates. Both block and striker are slotted to receive the tumbler (4 & 5). With the bolt system in consequence of the bolt having a long backward and forward travel the functions of the tumbler are performed by a separate cocking-piece (1) and a screw (5) in addition to which there is a screw spring (6). The block is raised or lowered by the hand lever b behind the trigger (7). The hand lever and the tumbler have a common axis-pin, pressing down the lever also forces the tumbler back to compress the spiral main spring (3). The impact of the block on the lower arm of the extractor (1) extracts the empty cartridge case. Drawing the lever back raises the block, closes the breech, the action remaining cocked or ready to fire. When the trigger is pulled the tumbler is fired and the striker is pushed forward by the compressed main spring. The block system has the great advantage of giving great leverage to extract jammed cartridges which before the introduction of the solid drawn ones were made from thin brass leaf rolled up like a scroll being liable to distortion, and not possessing sufficient elasticity to return to shape after expansion by the powder gas.

In the bolt system the breech is closed by a long hollow cylinder c with a short lever b like a door bolt handle in exterior form and manipulation. This system was primarily a Continental one. It is now universally adopted since the long drawback of the bolt gives ample space for the feed of cartridges from a magazine. Generally the breech bolt, in unloading is turned to the left and then drawn straight to the rear by the right hand grasping the knob of the lever b . In reloading it is pushed forward and turned to the right. A special variety is the straight pull where the bolt is not turned to be locked and unlocked. The Mannlicher shown in the plate gives an example of this variety. Other Mannlichers have turning bolts. The advantages claimed for the straight pull are that the breech action can be worked by a straight reciprocating motion of the bolt lever b , which never turns up into the line of sight, thus the rifle can be continuously fired (for the number of rounds in the magazine) without bringing it down from the shoulder. The Mannlicher straight pull bolt is locked by a drop catch working on a hinge underneath it, the catch engages a fixed projection on the

body of the rifle, which resists the rearward pressure of the powder gas. The initial back pull on the bolt lifts the hinge catch away from the projection. In the non straight pull actions the locking of the bolt is effectually done by the final turning down of the bolt lever.

The following is a more or less general description of the parts of the breech action of a modern rifle taking them as far as possible in the sequence of their functions above enumerated. The extractor (1) is provided with a claw or claws fitting into the side of the bolt working between the bolt and the body. The claw rides up a slot cut at the end of the chamber and springs into position in front of the rim or groove at the base of the cartridge. The extractor is pressed towards the case by springs, or it may itself be a spring. The extractor is so arranged that it does not partake of any rotation of the bolt. The cartridge case, being expanded by the powder gas, wants a sudden jerk to the rear to start it, this start is called 'primary extraction'. In the straight pull Mannlicher this jerk is aided by the lever cylinder (which works with some play backwards and forwards in rear of the bolt) starting before the bolt and extractor, and thus gaining some impetus. The complete drawback of the cartridge case is then effected by the bolt and its rear part acting as one piece.

In the non straight pull actions the sudden turning up of the lever *B* causes a powerful primary extraction to the rear by means of a screw motion, lugs on the bolt sliding in spiral grooves in the body. The final complete extraction is effected by the straight motion to the rear. In some straight pull rifles this mechanical advantage of the screw at the start is got by slipping a sleeve over the actual bolt the connection being made by lugs and helical grooves. One portion has only a reciprocating movement whilst the other also rotates. The striker or firing pin (2) is always a spindle surrounded by a spiral spring (3) the latter working with some play between a seating on the interior of the bolt and a collar on the striker. The striker and its cocking piece (4) must only have a simple to and fro movement hence it will be found that the cocking piece is constrained to move in a straight line by studs working in suitably formed grooves in the body when the bolt rotates. The striker, generally fixed to the cocking piece, partakes of its motion. The main spring (5) is only partly comprised by the cocking piece being forced to the rear (by a projection working in a groove or on a cam on the body) before the final movement of the bolt to the rear, the intention being not to give too much work during the extraction. A stud on the cocking piece engaging in a recess holds the cocking piece and striker whilst the bolt, in closing, itself moves forward over the striker and main spring, completing the compression. The sear (6) is pivoted on a pin or otherwise attached to the body of the rifle. In most patterns a spring (6) keeps the sear against the cocking piece and the trigger (7). The sear and its spring are one piece in the Mannlicher shown in the plate. The trigger (7) is a pivoted lever, one arm engaging with the sear, and the other arm formed to suit the firing finger. On pressing it to the rear, the sear disengages and is free to let the striker dart forward. Continental rifles have a double pull off, the first pull is a sliding movement, the leverage then shifts, then a slight check is felt, on further pressure the striker is released, the intention being to get a light final pull. They generally have no half cock without opening and closing the bolt, instead they have usually a locking or safety bolt. The Lee Metford has a half-cock

bent on its cocking piece, and can be fully cocked by drawing back the cocking piece by the hand.

Magazine feed arrangements of the bolt system come under three types—(1) when the cartridges are in a magazine tube in the butt or under the barrel as in the French Lebel rifle, (2) the type exemplified in the magazine of the Krag Jorgensen, fixed at the side and passing from the right underneath to the left (3) when the cartridges lie one above the other in an oblong magazine box, vertically under the bolt and in front of the trigger guard. When detachable the magazine is inserted in the opening in the body behind the breech and in front of the trigger guard as in the Lee Metford, and held in position by springs. When fixed, as in the Mannlicher, it is a part and prolongation of the trigger guard. Springs (10) (sometimes actuating levers) continually press each cartridge out of the magazine into the vacant loading position behind the breech. In type (3), as the cartridges are being expended the balance of the rifle is kept better than in type (1). The Mannlicher shows the method of loading by introducing bodily into the magazine the cartridges held together in a metal case or clip, which falls out when the last cartridge is loaded into the barrel. The clip holds each cartridge in the magazine until pushed into the chamber by the bolt. In the Mauser the cartridges are introduced into the magazine in one motion by stripping them from a loading clip or charger which is thrown away. Some actions are single loading as well as magazine loading. This is effected in the Lee Metford by pushing in the 'cut off' (a flat horizontal piece of metal pivoted to the right side of the body), which closes the top of the magazine, and serves as a platform for the cartridges singly placed in the chamber by the hand.

The success of automatic machine guns has led to the devising of self loading rifles, but such weapons are not yet sufficiently perfect for service use. They fall under two classes—(1) when the force of recoil actuates the breech mechanism, (2) when the gas pressure actuates it. The plate shows an example of (2). *A* is the barrel attached to a body *B*, a hollow breech *B* with locking studs, bolt head *E*, loose striker (2), which is held back by the spring (3) till it is struck by the striker bolt *G*, actuated by its spring *H*. This fires the cartridge. The figure shows the position of parts at firing, a movable percussion cup then drives back the striker, which drives back the striker bolt. There being studs on *G* working in spiral grooves in the interior of the hollow breech bolt *E*, the latter is revolved and the locking studs released. The whole action then recoils past the magazine opening, through which a fresh cartridge is fed, the spring *H* reclosing the breech.

RIGA, a town and port of Russia, capital of the government of Livonia (or Riga), on both sides of the South Dwina, about 5 miles above its mouth in the Gulf of Riga, 312 miles south west of St. Petersburg. It is situated on a sandy flat surrounded by hills on which numerous fine villas make a cheerful and showy appearance, and consists of the town proper and suburbs, still more extensive than the town itself. The bridge of boats across the river has latterly been replaced by a permanent bridge. Riga used to be a place of some strength, being both surrounded by walls and bastions, and defended by a citadel. The older part of the town, still confined within earthen walls, consists of narrow winding streets, huddled together without any regularity. The more modern parts of the town are much better built, and contain at least three good squares. Along

the river on both sides are spacious quays, which afford excellent promenades, and the Esplanade and gardens, both within and near the town, are well laid out. Among public buildings are the cathedral, not of much architectural merit, but containing some interesting monuments, St Peter's Church, a beautiful building, with an altar and chancel of marble, an oriental dome, and a lofty spire, the castle, the oldest edifice in the town, originally the residence of the masters of the Teutonic order and now occupied by the governor general, the town house, with the exchange adjoining it, the merchant house, the arsenal, the library, the museum, the gymnasium and several other superior schools, the theatre, and the military and other hospitals. The manufactures are not of great importance, and consist chiefly of starch, soap, playing cards, artificial flowers, spirits, and refined sugar. The trade is very extensive. The principal exports are flax, timber, eggs, cereals (chiefly rye and wheat), skins and hides, linseed, hemp and oil cake, the imports, machinery, coal and coke, cotton, steel, dyewood, herrings, wine, coffee, manure, iron, and rice. The value of the imports in 1900 was £5,713,140 of the exports £7,978,500. Riga is the residence of a governor, and the seat of several courts and public offices. New harbour works are being carried out, and electric trams have been introduced. Pop. (1897), 256,197.

RIGA, or **LIVONIA**, **GULF OF**, a gulf of the Baltic which washes the coasts of Courland, Livonia and Esthonia and contracts in the west to a comparatively narrow entrance, the Island of Osel almost closing it on the north west. Its greatest length, north to south, is about 120 miles, and its average breadth 70 miles. The chief river which it receives is the South Dwina, near the mouth of which is the port of Riga. The navigation is considered dangerous.

RIGGING. See **SHIP**.

RIGHT. See **RIGHT**.

RIGHT, PETITION OF. See **PETITION OF RIGHT**.

RIGHT ASCENSION. See **ASCENSION**.

RIGHT OF WAY, the right to pass over a certain route or track in going from one place to another. Such a right is a public right of way if enjoyed by everybody, private if enjoyed by a certain person or description of persons (as the inhabitants of a particular village, or the residents of a particular farm). Whenever there is a public right of way there is technically a highway, though the phrase is not used in connection with regularly kept up public roads, but generally with mere paths, tracks or by roads. The origin of a public right of way is generally said to be by dedication of it to the public by the owner of the soil, and in many cases it comes to be a question whether such a right exists or not: a prescriptive right being established when it can be shown that the public have used the route without hindrance for a moderate number of years. A private right of way may be acquired by immemorial usage, or by existing for forty years, or by express grant by deed. In Scotland a public right of way is acquired by possession for forty years or from time immemorial, but it may be lost by discontinuance.

RIGHTS, BILL AND DECLARATION OF. See **BILL**.

RIGHTS OF MAN a theoretical declaration passed by the French National Assembly in August, 1789. It was attacked by Edmund Burke in his *Reflections on the French Revolution*. Thomas Paine replied to Burke in his *Rights of Man* on the publication of the second part of which he was publicly prosecuted. See **PAINE (THOMAS)**.

RIGI, or **RIGHI**, an isolated mountain of brecciated rock in Switzerland, in the canton of Schwyz, between Lakes Zug and Lucerne, 5905 feet high. It affords among the finest views in Switzerland, and

is annually visited by numerous travellers. Two railways have been constructed to reach its summit, from opposite sides. They are on the 'rack and pinion' principle, there being a central toothed rail into which works a toothed wheel under the loco motive. There is also a short line on the mountain worked on the ordinary principle. Hotels and other establishments are numerous, and there is a chapel with an image of the Virgin that attracts many pilgrims.

RIGIDITY, in mechanics, that property of a body in virtue of which it offers resistance to a change of form. *Rigid dynamics* is the dynamics of rigid bodies.

RIGOR MORTIS. See **MISCIE**.

RIMINI (anciently *Ariminum*), a town of Italy, on the Adriatic, in the province of Forlì, 24 miles east of the town of Forlì, beautifully situated in a fertile plain between the mouths of the Marecchia and the Ausa, and on the railway from Milan to Brindisi. Many of its houses are handsome, and it has several palaces built of marble. The principal objects of attraction are the cathedral, or church of San Francesco, originally built in the thirteenth, but remodelled in the fifteenth century, after the designs of Leon Battista Alberti, the great restorer of Roman architecture, and regarded as his masterpiece, the church of San Giuliano, with a superb altar piece, by Paul Veronese, the Palazzo del Comune, with a picture gallery, a library founded in the seventeenth century, the triumphal arch of Augustus, or Porta Romana (erected B.C. 27), of simple and massive architecture, with two Corinthian columns on each side, and above all the bridge of Augustus over the Marecchia, built entirely of white marble, consisting of five arches, each with a span of 27 feet, and still in perfect preservation. The fisheries are extensive, and silk is manufactured. Rimini is also frequented for sea bathing. Pop. 12,000.

RINDERPEST, or **CATTLE PLAGUE**, a contagious disease which attacks animals of the ox family, and is attended with the most deadly results. The disease appears to be identical with what was formerly known as murrain, and is sometimes called the steppe murrain from the Russian steppes which are its habitat. Europe has been repeatedly devastated by this plague. There was a general visitation in the year 376, another in 510 which spread over most of the dominions of Charlemagne and in later times the visitations of 1511-1599, 1682, 1711-14, and 1743-55 are particularly noted. The insular situation of Great Britain and the limited importation of cattle, appeared to have saved it from most of the periodical ravages of this disease up till the eighteenth century. It appeared there in 1714, and again in 1715 when it continued its ravages till 1756. It spread extensively on the Continent in 1857, and it appeared in Great Britain again in 1865, when its ravages were continued extensively till 1867. There was a slight visitation in 1872. The great plague of 1865-66 appeared in a dairy in North London in the month of June, 1865, and spread with great rapidity. 27,132 animals were reported to have been attacked up to October 21, out of which 12,680 had died, and 8998 were slaughtered. A report by a royal commission was issued on 31st October, which traced the disease to the importation of cattle, and recommended restrictive measures and the slaughter of diseased animals. Two subsequent reports were issued by the commission, one on 6th February, and one on 1st May 1866. An official report issued 1st February, 1866, showed the number of cattle attacked up till that time to have been 120,740, of which 73,750 had died, and only 14,162 were reported as having recovered. An act of Parliament was passed

in February, and more stringent regulations issued by the privy council in March. The treatment of the disease having proved a failure, the policy of 'stamping out' or killing all infected animals was adopted, while cattle fairs having proved powerful instruments in transmitting the disease, the movements of cattle were subjected to the most stringent regulations. These measures were soon attended with beneficial results. In a return issued on 22d June the total number of cattle attacked was reported at 248,965, died, 124,187, killed, 80,597, recovered, 32,989, unaccounted for, 11,192. The disease had now nearly spent its force and by the end of October, 1866, it had almost disappeared, but there was a short recurrence next year. Rinderpest appeared in Somaliland in 1889, and rapidly spread southwards, crossing the Zambesi in 1896. It caused great loss to the farmers of South Africa, and led to troubles with natives whose cattle were affected.

The rinderpest or cattle plague does not generate spontaneously in Great Britain, but it is indigenous in the Russian steppes, and the various European visitations are supposed to have had their origin there. To what particular causes its generation there is owing does not appear to have been ascertained. The plague is transmitted by a special virus, which possesses, like plague germs in general, great vitality and powers of multiplication. It infects the blood and all the discharges of the infected animals, and is capable of being transmitted indirectly by any of these to great distances. Sheep and other animals are liable to be affected by it, and have been instrumental in transmitting it, but it does not spread so freely, and is never so fatal, among any other animals as among those of the ox family. The disease has a period of incubation varying from two to twenty days. The first symptom of the attack is a slight elevation of the temperature of the body, this is followed two or three days after by a heightened colour of the mucous membrane of the mouth and a granular yellowish eruption on the gums and lips, which subsequently extends to the tongue, palate, and cheeks. The skin becomes congested, and develops scales with papular eruptions, and finally a slimy discharge comes from the eyes and nose. Every variety of empirical treatment was tried with the cattle plague in 1865 and 1866, but it would appear that all had little or no effect upon the mortality. The only treatment found effective was the stamping out process, with the prohibition of importation, and the stringent regulation of the movement of cattle. Inoculation has latterly been found effective in combating the disease.

RING, an ornament for the fingers which has been worn from the most ancient period of civilization. Among the ancient nations who are known to have attached special importance to the wearing of rings are the Assyrians, Egyptians, Hebrews, Greeks, and Romans. From the earliest period at which we have mention of rings they are associated with signets. From the earliest period also rings appear to have been worn as ornaments especially by females, on various parts of the body besides the hand. The nose, ears, arms, and even the legs and toes have, among various peoples, been decorated with them. Rings have also from a very early period been reckoned as symbols of authority, and that in a double aspect. As a mere ornament rings would serve to represent dignity and honour, and as signets they were early used officially to delegate authority. Rings are mentioned in the book of Genesis. It is frequently supposed that the Hebrews derived the use of rings from the Egyptians, and it is related in Genesis that Pharaoh took his ring from his finger and put it on that of Joseph, by way of transferring the executive

authority of a delegated ruler to the latter. Rings and bracelets are mentioned among the presents made by Abraham's servant to Rebecca. Among the Egyptians rings were worn in great profusion. They were made of gold, with an engraved stone or scarabæus, and were often very massive. The common people wore rings of blue porcelain. The Egyptian rings were often of great size, so as to cover the space from one joint to another of the finger. The custom of wearing rings was probably introduced into Greece from Asia, as signet rings appear not to have come into use in that country till about the time of the Peloponnesian war. In later times rings were more important for ornamental purposes than for use, and several were worn by one person. Women also latterly began to wear rings, but these were of less costly materials than those of men. They were worn usually on the third finger of the left hand. In Sparta only iron rings were used. The Romans are variously said to have adopted the use of rings from the Sabines, the Etruscans, and the Greeks. For long they were made chiefly of iron, though sometimes of stone, and every free Roman had the right to use a seal ring. Even in late Roman times, those who liked to keep alive the customs of their sturdier ancestors continued the use of the iron ring. The association of rings with marriage may have come down to us from the Romans, the bridal ring being regarded as a pledge for the fulfilment of a contract. At first ring wearing was confined to men among the Romans and was practised only to a limited extent, but growing luxury led to the excessive use of rings by both sexes. The right of wearing gold rings (*jus anuli auri*) was at first accorded only to ambassadors, chief magistrates, senators, and finally to persons of the equestrian order, while silver began to supersede iron among ordinary citizens. Till the close of the republic the use of gold rings was a privilege of the equestrian order. When the right of wearing a gold signet ring was conferred by the emperors it began to be freely distributed, and soon ceased to be any distinction. The sentimental reason which is still sometimes given for wearing the ring on the fourth finger of the left hand, that there is a vein directly from that finger to the heart, is given by Aulus Gellius. A ring appears from an early period to have been one of the insignia of the office of a bishop. The restoration of a deposed bishop was effected at the Council of Toledo (633) by returning to him the episcopal ring. Rings have always been in great demand among savage tribes when they have either had ingenuity enough to invent them, or have come in contact with civilized nations who use them. Superstitious as well as sentimental feelings have often been associated with rings, and especially with the precious stones worn in them, to which particular characters were assigned. Rings were also used as charms against demons, the evil eye, and other ills and inconveniences. Motto rings date from the time of the Romans, they appear also to have been in use among the Jews. They were long popular in Great Britain under the name of posies. For the bishop's ring see the article INVESTITURE. See also RING MONEY.

RING DOVE, or CUSHAT (*Columba palumbus*), the largest species of pigeon inhabiting Britain. This bird occurs very generally throughout the wooded parts of the country, and in Europe generally, but not in the most northern parts. Its range extends eastwards to Persia, and it also occurs in northern Africa, Madeira, and the Azores. These birds are permanent residents in Britain, and on the approach of winter assemble in flocks. They are birds of powerful flight. The feet are suited

either for perching or for terrestrial locomotion. The hinder toe is short, the outer and inner toes in front being equal in length. The average length is about 16 or 17 inches. The bill is of yellowish colour, the membranous part covering the nostrils being whitish. A bluish gray colour prevails generally over the head, cheeks, neck, back, and rump. The sides of the neck have a greenish lustre, a patch of white existing in this latter situation on each side, and almost meeting its neighbour patch posteriorly, thus forming a kind of collar marking or 'ring'. The scapular feathers and wing coverts are deeper tinted than the rest of the body. The breast and under parts are coloured of a purplish red, which, towards the under surface of the tail, passes into a bluish gray. The outer wing margins and greater coverts are white. The tail on its upper surface is bluish gray, merging into black towards the tip. The feet and legs are reddish or purple, and the iris of the eye is yellowish white. These birds breed twice or three yearly. The eggs are always two in number, and are of a white colour. Incubation lasts about twenty days, and both sexes assist in hatching the young. The young are born blind and featherless, and are nourished with half digested food from the crops of their parents. The food of the ring dove consists of vegetable matter of various kinds, such as grain, berries, green corn, and the leaves and tops of the turnip. Early in February pairing and nidification commence. The nest forms a plat form of sticks and twigs loosely placed together. See illustration at ORNITHOLOGY (Pl. IV.)

RING MONEY, a metallic currency in the form of rings. This seems to have originated with the Egyptians, with whom rings were freely used as ornaments and the same rings appear to have answered both purposes. The use of ring money in Africa subsists to this day. Ring money is manufactured in Birmingham for the use of African traders. A similar usage was found by Caesar among the Celts of Gaul and appears also to have prevailed in Britain as well as among the Scandinavian nations. Whether it was brought by traders from the East or originated independently among these nations it is impossible to say. A form of ring money was also anciently used in Ceylon.

RING OUZEL. See OUZEL.

RING WORM (*Tinea*) occurs in three varieties according as it attacks the scalp, the beard, or some other part of the body. In all cases it is due to the presence of a vegetable parasite consisting of minute round bodies and of thread-like structures formed of rows of rod-shaped bodies of a beaded appearance. This is the growing fungus (*Trichophyton tonsurans*) and its spores, and wherever ring worm occurs this is present between the layers of cells of the scarf skin, in hairs and hair sheaths. *Ring worm of the body* (*Tinea circinata*) is the name given to the disease when it occurs on non hairy parts of the body. It is most common on the face, neck and trunk, but it also occurs on the hands, arms, and wrists. It consists of small circular patches, rose coloured and slightly raised, covered with small branny scales. Usually round the margin is a ring of very small blisters. The spot is the seat of a tingling and itching sensation. It spreads round the margins, and as it spreads the centre heals up, so that a large red ring with a pale centre is formed. *Ring worm of the scalp* (*Tinea tonsurans*) begins by small red patches like those described above and spreads at the margins. It involves the hairs, which become penetrated by the fungus, and are dry, dull, and twisted. They are easily pulled out and become very brittle. The affected patch becomes covered with a grayish white powder. Inflammation may be produced and crusts

formed. This variety of ring worm is commonest in children. *Ring worm of the beard* (*Tinea sycosis*) is similar to the scalp variety. A lotion of bichloride of mercury is often sufficient to kill the fungus, but if it prove ineffectual glacial acetic acid may be painted all round the spreading margins of the ring. In ring worm of the head and beard the hair of the diseased patches and for a little distance beyond should be cut short and crusts should be removed by poulticing, washing with water and soft soap, &c. The general health should be maintained by the use of tonics and otherwise. Ring worm is very contagious.

RINMANN'S GREEN, a permanent green pigment known also by the names of *cobalt green*, *zinc-green*, and *Saxony green*, prepared by mixing a solution of zinc sulphate (white vitriol) with a solution of cobalt nitrate precipitating by carbonate of soda, collecting, washing, drying and heating the precipitate. It is no longer used.

RIOBAMBA, a town of South America, in Ecuador, 85 miles north east of Guayaquil, and 4 miles from the ruins of Old Riobamba, which was destroyed by an earthquake in 1797. Pop. 20,000, chiefly Indians.

RIO BRANCO, a large river of Brazil, entirely in the state of Amazonas. It rises on the eastern slopes of the Serra Parima, flows eastwards parallel to the Serra de Pacaraima, turns southwards before reaching British Guiana and falls into the Rio Negro, lat. 1° 25' S. lon. 61° 10' W. It has a length of about 530 miles, and receives numerous affluents.

RIO BRAVO, or **RIO GRANDE DEL NORTE**, See NORTE.

RIO DE JANEIRO, one of the maritime states of Brazil on the south east coast of the republic, area according to official returns 26,634 square miles. The central part of this territory is decidedly mountainous, being traversed generally from east to west by a series of ranges, of which the loftiest and most conspicuous is the Serra dos Orgãos. They are almost entirely composed of granite. The mountains slope down on the north and south—in the former direction towards the basin of the Paraíba, to which all the surface of the province on that side belongs, and in the latter to the coast, which receives the drainage from a great number of comparatively small streams each carrying its waters directly to the ocean. The shore toward the north east is lined by numerous lakes and lagoons. The soil does not seem to possess much natural fertility. Great part of it consists of a retentive clay, ill adapted for agricultural operations, but the warmth and moisture of the climate are so favourable to vegetation that magnificent forests and valuable crops are found growing on spots which in less genial regions might seem destined to perpetual barrenness. At the same time many tracts of the richest land occur, and are turned to the best account. The crop which attracts the largest share of attention is coffee. The other leading crops are sugar, rice, millet, mandioc, and cotton. The forests are rich in timber both for ordinary and ornamental purposes, in dye woods, in gums and balsams and valuable medicines. The domestic animals, originally imported from Europe, have prodigiously increased, and immense herds of cattle are reared. This province is by no means rich in minerals, at least in the precious metals. Iron, however, abounds, though it is not worked, and the decomposition of granite has formed extensive beds of the finest kaolin. The state assembly used to meet at Niteroy, but Petropolis is the present capital. Under separate jurisdiction from the state is the Federal District of Rio de Janeiro, embracing the city of Rio (see next article) and its surround-

ings. The population, inclusive of the federal district, according to the census of 1890, was 1,399,535.

RIO DE JANEIRO, the capital of the Republic of Brazil and the second city of South America, most beautifully and advantageously situated on the west side of the bay of same name. On nearing the coast the first object which meets the view is the Pão d'Assucar, a peak so called from its sugar loaf like appearance, and rising abruptly from the sea to the height of nearly 1000 feet. On proceeding north into the bay, among a number of beautiful little islands, clothed with richest verdure, or crowned with magnificent palm trees, the land, both on the right and left, projects into the sea, leaving a passage between rocky barriers not more than 1 mile wide. Immediately beyond this magnificent portal, on the left or west lies the city of Rio de Janeiro, guarded from hostile approach by sea by a number of forts, on islands and on salient points of the mainland. The site consists of flat ground along the shore, and of hills of considerable height, with intervening valleys. The oldest and still most important part of the town occupies a flat tongue of land of an irregularly quadrangular shape, having its greatest length north-west to south-east. Towards the south and south-east the lofty and finely wooded promontories of Mount Corcovado press close upon the houses, the space between is generally level and covered with houses of substantial and often elegant appearance regularly built, for the most part of granite. On the west side of this part of the town is a large square called formerly Praça da Aclamação, now Praça da República and immediately beyond it is the new town. There are also several small suburbs. Among the principal public buildings are the senate house, a large modern structure not possessed of much architectural merit, the chamber of deputies, the town house (Palácio Municipal), a simple and unadorned edifice, the octagonal church of Nossa Senhora da Glória finely situated on a rounded hill of the same name which projects into the sea, the church of São Francisco with a hospice attached, the church of the Cross, the church of Candellaria, one of the largest and finest in the city, the former convent of São Benito, a massive structure, the former convent of St. Anthony, a gorgeous edifice, with two immense chapels and a vast cloister, the aqueduct, the finest architectural monument of which Rio de Janeiro can boast consisting of a double series of forty-two lofty and beautiful arches, stretching from Mount Corcovado and conveying the water of its springs into the heart of the city to supply its numerous and elegant fountains, the former imperial palace, a large stone building, long used as a residence by the viceroys, and now appropriated to public offices, the palace of the fine arts, a beautiful structure in which annual exhibitions are held, the custom house, the exchange, the post office, court house, the mint, opera house, naval arsenal, and museum. Among benevolent establishments are the Casa da Misericórdia, founded in 1582, the English hospital, hospital for lepers, orphanage, asylum, &c. The educational and literary institutions include the national college or gymnasium, the college of São José, a polytechnic school, a school of medicine, a naval and a military academy, an institute of music, a school of fine arts, a library of 80,000 volumes, and a botanical garden. A number of tramways have been laid down, and in the working of these, wire ropes and electricity are both used. The telephone is in common use. The city is not healthy, yellow fever is often prevalent in the warmer months. The roadstead of Rio de Janeiro is one of the finest in the world. The accommodation on shore is, however, defective, though docks and

quays have lately been constructed. The manufactures are not yet of much importance, but are steadily increasing, and in particular a number of cotton and woollen factories have been started. Other manufactures include hats, boots and shoes, glass, paper, gloves, beer, mineral waters, &c. The total value of the exports from Rio in 1900 was about £6,750,000, of which £5,670,000 represented coffee, mostly sent to the U. States. The imports for 1900 were valued at £9,462,000 of which fully one third represents imports from Britain. Germany, the United States, and France come next in order in the value of their imports into Rio. The articles imported are very various including cottons, paper, grain and other food stuffs animal and vegetable, silk, woollens, machinery, iron and steel, gold, silver, copper, linen, lumber, &c. The total number of vessels entered in 1900 was 843 and the total tonnage 1,522,754, 790 vessels of 1,107,122 tons cleared. Fully half the tonnage is British. The first settlement in the neighbourhood of Rio de Janeiro was formed by the French in 1555, and consisted chiefly of Protestant refugees. Their leader Villegaignon, having proved a renegade to his faith had almost ruined the settlement by internal dissension, when a Portuguese force appeared and completed its destruction in 1567. The conquerors laid the foundation of a new city, which they called St. Sebastian. Bahia was formerly the capital of the country but on the arrival of Don John in 1808 he transferred the seat of government to this city. Pop. in 1872, 271,972, in 1890, 522,651, in 1900, 750,000.

RIO GRANDE DO NORTE, a maritime state in the north-east of Brazil, area 22,196 square miles. The surface is mountainous in the south and south-west, where it is covered by several mountain ranges. The principal rivers have all either a north or an east direction. The proximity to the equator makes the climate intensely hot, it is said, however, not to be unduly, the air being remarkably pure. The soil is generally good, but not remarkable for its fertility. For a long time the sugar cane was the principal cultivated crop, but considerable tracts formerly devoted to it are now occupied by cotton, which may be regarded as the staple of the province. The other leading crops are mandioca, millet, and hurricanes. Many of the plains are grazed by large herds of horses and cattle. The minerals include gold, silver, iron, salt, amethysts and rock crystals, lime stone, sandstone, and granite. The forests are not very extensive. Its state assembly holds its sittings at Natal. Pop. (1890), 268,273.

RIO GRANDE DO SUL, a southern maritime state of Brazil, area, 91,336 square miles. Along the coast for more than half the extent of the coastline of this state stretches the great Lago dos Patos, which communicates with Lake Mirim, and which receives the waters of the south-eastern part of the territory. Those to the south-west belong to the basins of the Paraná and Uruguay, and flow west. The mountain chain called Serra Geral divides the state into two unequal parts. The sea coast is flat and sandy, and is lined by a series of reefs, which make the navigation dangerous. The interior is partly occupied by arid serras, but is mostly fertile. The climate is temperate, and the productions are more like those of Europe than of the rest of Brazil. Maize, rice, and flax, particularly the first, are largely cultivated. The finer European fruits, especially figs and peaches, find a genial soil. The minerals include gold, iron, sulphur, and porcelain clay of the finest quality. The chief occupation of the inhabitants is the rearing of cattle and the

preparation of dried beef. Horses and mules are also reared. There are a number of German colonies, and many Italians have settled in the state. There are several railways. Porto Alegre is the capital. Pop. in 1890, 897,455.

RIO GRANDE DO SUL, or **DO SÃO PEDRO**, a town of Brazil, in the above state, agreeably situated on a peninsula between the Bay of Mangueira and the south extremity of the Lake of Patos. Its houses are mostly poor structures, and its streets, though regular and provided with side walks, are unpaved. It contains four churches, a town house with prison, a secondary and four primary schools. Its port, which is well sheltered, and admits vessels drawing 15 feet, enables it to carry on a considerable trade in dried beef, tallow, flax, horns, &c., and particularly hides. One of the greatest obstacles to the prosperity of the town is the want of good water. Most of its trade is carried on in Brazilian vessels, and the foreign vessels are now mostly German. Beer, matches, biscuits, woollens, and other articles are manufactured. Pop. 20,000.

RIOJA, **FRANCISCO DE**, one of the classical Spanish lyric poets, was born at Seville about 1600, and studied first law and then theology. The minister Olivarez, whose protégé he was, soon obtained for him a prebend in the cathedral of Seville. He then became royal historiographer, inquisitor at Seville, and lastly, inquisitor of the supreme tribunal of the holy office. The downfall of his patron involved his own: he was imprisoned, and only obtained his liberty after he had undergone a formal trial and completely established his innocence. Philip IV., whose favour he had regained, made him director of the royal library. He died in 1659. As a poet, he formed himself on the classic and Italian models, particularly Horace and Seneca, kept himself, in style and language, free from the tasteless eccentricities of his contemporaries, and thus preserved the Spanish fire, a glowing fancy and true spirit of the lyric. His *Silvas* exhibit rich pictures of rural life, remarkable for their truth to nature.

RIOM, a town of France, in the department of Puy de Dôme, in a fertile plain near the Ambert, 10 miles north of Clermont. It is encircled by well-planted boulevards, has spacious streets, and houses which, though of a somewhat gloomy appearance, from the dark lava of which they are built, are generally good, and occasionally handsome. The only buildings deserving of particular notice are some fine old churches, the court house, prefecture, several hospitals, and the remains of the old ducal palace, now used as a palace of justice. The principal manufactures are tobacco and linen and there are several distilleries and tanneries. Riom is the seat of a court of first resort and commerce, and possesses a communal college. Pop. (1896), 7908.

RIO NEGRO. See **NIRO** (Rio).

RIO TINTO, or **MINAS DE RIO TINTO**, a town of Spain, in the province of Huelva, near the source of the river Rio Tinto, 38 miles north-east of Huelva, with which it is connected by railway. The town has grown up in connection with the rich copper mines belonging since 1873 to the Rio Tinto Company. These mines were worked by the Romans, but from the fifth to the sixteenth century they remained untouched. Several other towns in the neighbourhood are also dependent on the mines. Pop. (1887), 10,671.

RIOTS are disturbances of the public peace, attended with circumstances of tumult and commotion, as where an assembly destroys, or in any manner damages, seizes, or invades the property either of individuals or the public, or does any injury to the persons of individuals, or invades,

seeks, or pursues them, with intent to confine them or put them in fear, or violently constrains any one to act contrary to his interest, duty, or inclination. Rioting is distinguished from treason in not being directed against the person of the sovereign, or the general authority of the government, but having in view only the redress of some particular grievance, or the accomplishment of some private object. By the English common law a riot is constituted by three persons or more assembling of their own authority and tumultuously disturbing the peace in execution of some enterprise of a private nature. It is punishable by fine or imprisonment, with or without hard labour. All who are actually engaged in a riot are considered in law as equally guilty of the offence, but the circumstances of each are to be considered in assigning his punishment. In Scotch law, rioting is termed mobbing. A person may be guilty of mobbing who directs or excites a mob although he is not actually present in it. Mere presence without participation may constitute mobbing. By act 1 George I. cap. v. s. 2, called the Riot Act, if any persons to the number of twelve are unlawfully assembled to the disturbance of the peace, and any one justice of the peace, sheriff, undersheriff or mayor of a town, shall think proper to command them by proclamation to disperse, if they contemn his orders and continue together for one hour afterwards, such contempt shall be felony punishable by death (now by penal servitude or by imprisonment). The act also contains a clause indemnifying the officers and their assistants in case any of the mob should be killed or injured in the attempt to arrest or disperse them.

RIOW. See **RIHO**.

RIPLEY, a town of England, in Derbyshire, 10 miles north by east of Derby. It has blast furnaces, foundries, boiler works, and manufactures of cotton wicks, silk, cotton, and mohair braids, &c. Pop. (1891) 8774, (1901), 10,111.

RIPON, a city, and formerly a parliamentary borough of England, county of York (West Riding), on the right bank of the Ure, here crossed by a handsome stone bridge of fourteen arches 22 miles N.W. of York, on the North Eastern Railway. It has four principal, irregular, but well kept streets, rising from all sides towards the spacious market place, which is surrounded by good houses, with a handsome obelisk in the centre. On the south side of the market place stands the town hall, an elegant structure, comprising a handsome suite of assembly rooms, with other accommodations. The cathedral (restored 1862-76), dedicated to SS Peter and Wilfrid, is one of the finest churches in England. It is a large cruciform structure, with two square towers, each 110 feet high, length, east to west, 266 feet, length of transept, 132 feet. It contains many curious and interesting monuments. Trinity Church is also a very handsome building, cruciform, and in the Early English style. There are a free grammar-school (founded by Edward VI.), national and other schools, mechanics' institution, infirmary, dispensary, and other charitable institutions. The principal manufactures are machinery, saddle trees, leather, and varnish. It ceased to send a member to Parliament in 1885, but it gives its name to one of the parliamentary divisions of the West Riding. The abbey of Ripon was first founded in the seventh century, and the Saxon crypt of the cathedral was probably built by Wilfrid in 671-78. In 1836 the see of Ripon was established, and in 1888 the diocese of Wakefield was separated from it. Pop. (1881), 7390, (1891), 7512, (1901), 8225.

RISHIS (from *rish* an old Vedic root signifying to see), sages of the Hindu mythology, sprung from

the mind of Brahma, and attendants in alternate months on the sun. Seven of them are enumerated. The Rishis were also inspired sages, of whom the Vishnu Purana enumerates three kinds—royal rishis, or princes, who have adopted a life of devotion, divine rishis, who are both sages and demi gods, and Brahman rishis, or sons of Brahma. Rishi afterwards came to be applied to all personages distinguished for piety and wisdom.

RITORNELLO (Italian), in music, a passage which is played whilst the principal voice pauses, it often signifies the introduction to an air or any musical piece. This ritornello is often repeated after the singing voice has concluded, hence the name—*Ritornelli* are also popular songs of three lines each, sung in the Italian mountains, which are also used by the *improvisatori*. The metre and number of the syllables are not subject to rule. The first line, however, is generally the shortest.

RITTER, HEINRICH, a German philosopher, was born in 1791 at Zerbst in Anhalt, attended the gymnasium at his native town, and studied theology at Halle, Göttingen, and Berlin from 1811 to 1815. At the same time he occupied himself, from choice, with philosophical studies. In 1815 the calling out of the volunteers led him to France. On his return he devoted himself exclusively to philosophy, especially in the department of history, in which he adopted the method and critical views of Schleiermacher. As early as 1817, in a work *On the Training of Philosophers* by means of the History of Philosophy (*Ueber die Bildung der Philosophen durch die Geschichte der Philosophie*), he advocated the view that a full knowledge of the history of philosophy was necessary to enable the student to pursue with advantage his original investigations. After taking his degree at Halle, he qualified himself at Berlin as a university teacher, and from 1824 held an extraordinary professorship in that city. Finding no hope of further promotion there, he accepted a call to Kiel in 1833, whence in 1837 he removed to Göttingen, where he continued to occupy the university chair of philosophy till his death on 3d February, 1869. Ritter's best works belong to the history of philosophy. His first work in this department was an investigation into the doctrines of Empedocles (*Untersuchung über die Lehre des Empedokles*) in Wolf's *Literarische Analekten* (1820). His *History of Ionian Philosophy* (1821), his *History of the Pythagorean Philosophy* (1826), and his *Notes on the Philosophy of the Megarean School in the Rheinisches Museum*, are recognized as models of historical investigation on the principles of Schleiermacher. His historical master piece is the *History of Philosophy* (*Geschichte der Philosophie*, twelve volumes, 1824-53), which brings down the general history up till the time of the appearance of Kant. It was supplemented by a *Review of the History of German Philosophy from the Time of Kant* (*Uebersicht über die Geschichte der neuesten deutschen Philosophie seit Kant*, 1853), and *Christian Philosophy in its Conception, External Relations, and History until the most Recent Times* (*Die christliche Philosophie nach ihrem Begriff, ihren äussern Verhältnissen und ihrer Geschichte bis auf die neuesten Zeiten*, (1858-59). He also edited Schleiermacher's *Geschichte der Philosophie* (1839), being a summary drawn up by that professor for his lectures. In his *History* Ritter professes not to criticize philosophy on the basis of any particular modern system, but to regard it as a self developing whole. In his divisions of Greek philosophy he follows Schleiermacher. The series of Ritter's works on specific departments or particular doctrines of philosophy, begins with *Preflections on the Elements of Logic* (*Vorlesungen zur*

Einleitung in die Logik, 1823), which was followed in 1824 by an *Outline of Philosophical Logic* (*Abriss der philosophischen Logik*). In *Die Halbkantianer und der Pantheismus* (*The Demi Kantists and Pantheism*, 1827) he undertook a polemic on the current views of the relation of the world to God and the apprehension of pantheism. His view of the design and scope of philosophy as a whole he gave forth in his work *On the Relation of Philosophy to Science in General* (*Ueber das Verhältniss der Philosophie zum wissenschaftlichen Leben überhaupt*, 1835). This was followed by the comprehensive work *On the Knowledge of God in the World* (*Ueber die Erkenntniss Gottes in der Welt*, 1836), the *Treatise on Evil* (*Ueber das Böse*, 1839), the *Minor Philosophical Treatises* (*Kleine philosophische Schriften*, three vols 1839-40), in which he treats of the principles of jurisprudence and politics, of aesthetics, and of some particular problems of psychology. To these were added, at a later period, his *System of Logic and Metaphysics* (two vols 1856), the *Encyclopædie der philosophischen Wissenschaften* (three vols 1862-64), *Ernest Renan über die Naturwissenschaften und die Geschichte* (1865), the popular *Treatise on Immortality* (*Unsterblichkeit*, 1866), and *Philosophische Paradoxa* (1867). In these works he exhibits the independence in thought and manner of a philosophical scholar.

RITTER, KARL, an eminent geographer, was born on 7th August, 1779, at Quedlinburg, Prussia, received the rudiments of his education at the institution at Schnepfenthal, studied afterwards at Halle, with the view of qualifying himself for the profession of teacher, and in 1798 became tutor in the family of a wealthy banker of Frankfurt on the Main, whose sons he accompanied on a tour through Switzerland, Italy, and France. He subsequently resided for a considerable time at the university town of Göttingen, in order to avail himself of the treasures of its library. In 1819 he succeeded Schlosser as professor of history at the Frankfurt Gymnasium, and the following year, after giving to the world his *Vorhalle europ. Volksgeschichten vor Herodot* (*Introduction to the History of European Nations before Herodotus*), became professor extraordinary of geography at the University of Berlin, an office which he held with distinguished reputation for nearly forty years. With Ritter may be said to have commenced a new epoch in geographical science, and a new department, that of comparative geography, claims him as its founder. His great work is *Die Erdkunde im Verhältnisse zur Natur und Geschichte des Menschen* (*Geography in its Relations to Nature and History*), the two first volumes of which appeared at Berlin in 1817-18, but it was afterwards continued on a more extended plan, and ultimately comprised upwards of twenty volumes. It was left uncompleted at the author's death, and forms a vast repository of valuable information relative to physical and general geography, some of the monographs, such as those of the camel, tiger, &c, being especially excellent. Among the other productions of Ritter may be mentioned *Europa, ein geographisch historisch statistisches Gemälde* (*Europe Delineated Geographically, Historically, and Statistically*), and *Die Stupas, oder die architektonischen Denkmale an der indobaktrischen Königstrasse und die Kolosse von Bamyân* (*The Stupas, or Architectural Monuments on the Indo Bactrian Highway and the Colossi of Bamyân*). Of his smaller works we may notice *The Colonization of New Zealand*, *The Jordan*, and *The Navigation of the Dead Sea*, and *A Glance at Palestine and its Christian Population*. He also contributed extensively to the journals of the Berlin Geographical Society. He died at Berlin, 28th September, 1859.

RITUAL (Roman Catholic Service Book) See **LITURGY**

RITUALISM is the generic name given by outside observers to a series of changes introduced in recent years by various clergymen of the High Church party into the forms of the Church of England as observed by them. These changes of ritual may be described externally as generally in the direction of a more sensuous and ornate worship, and as to their spirit or animating principle, as the infusion into outward forms of a larger measure of the typical element. They are defended on the grounds of law, ancient custom, inherent propriety, and divine sanction or authority. As the views of the ritualists are frequently misapprehended by their opponents, we shall endeavour to give as clear a summary of them as our space will permit, while noting some of the objections which have made them a subject of such wide spread jealousy both in the church itself and in the country at large.

One element of confusion in regard to Ritualism arises from the diversity of opinion which prevails among those who do not belong to the special class to which the distinctive appellation of Ritualists properly belongs. With the exception of a very small minority, those who hold the New Testament to be an authoritative guide in matters of worship are agreed that the whole institution of the Christian church, down to the details of the ceremonial of worship, are not laid down in it, and in this opinion the Ritualists are at one with the majority. A portion of this majority holds that all pomp and ceremony in outward worship is opposed to the spirit of the Christian religion, while another portion holds that such forms are not opposed to Christianity, and are the natural and appropriate expression of outward worship. This last party, the whole of which is frequently confounded by those who hold the opposite view with the Ritualists proper, again divides into two distinct sections. The former advocates such outward observances not authoritatively enjoined in the New Testament as it may be deemed advisable to institute merely on natural and æsthetic grounds. It holds them to be established merely on human authority and on grounds of human reason, and to be subject to whatever changes that reason may suggest, the latter holds that all authoritative and obligatory regulation upon ritual is not laid down in the New Testament, but that a knowledge of what is obligatory in ritual is derived from apostolical tradition. It is to this last party, which maintain the tradition of an authoritative ritual, that the term Ritualist properly belongs, and it is to its distinctive peculiarity in this respect that the instinctive alarm with which the spread of ritualistic practices has been generally viewed is to be ascribed. The theory of a tradition of ritual is not, however, to be regarded as the fundamental principle of the Ritualists. It is rather a consequence which has been forced on them by the importance which they attach to ritual itself. This view has been productive with them of a series of similar results. It has caused them to carry further than others the inferences they draw from the New Testament itself as to outward observances, it has led them to borrow more freely from the Old Testament, and, finally, it has induced them to supplement both by tradition.

Much of the argument advanced by the Ritualists in support of their positions will be regarded by the majority of their opponents as undisputed fact or undoubted truism. We shall omit much of this kind in order to bring out more clearly the peculiarities of their view, but a brief statement of what may be regarded as common ground will also serve to illustrate it more fully. That external forms are neces-

sary to the celebration of public worship, that imposing forms produce powerful impressions on the great mass of men, that such forms are susceptible of being used typically, or as object lessons for conveying instruction, that in the Old Testament, both in what are called the patriarchal and the Mosaic dispensations, such forms were so used, that in the New Testament Christ appears as instituting two specific forms of typical ceremonial in baptism and the Lord's supper, are positions which few of the opponents of Ritualism will care to dispute. On these generally-received grounds the Ritualists proceed to argue that the design of the institution of Christianity was not to abrogate the external ceremonials by which the former dispensations were distinguished, but to replace them by a higher ceremonial, in which what was not formally abolished in the preceding ceremonials is retained. Of the free use made of the New Testament in the inferential construction of ritual one illustration will suffice. We quote with abridgment from Blunt's Dictionary of Doctrinal and Historical Theology: 'If the early Christians wished to find a pattern on which to model their services, they would turn to the account of worship as it exists in heaven, and as it was revealed to the last of the apostles.' After quoting a passage from the Revelation, in which the adoration of the Lamb by the hosts of heaven is described, closing with the passage, 'Moreover the elders are clothed with white raiment, having crowns of gold on their heads, and there were seven lamps of fire burning before the throne, suspended over a sea of glass like unto crystal,' the writer, while admitting the doubtful meaning of many passages in the Revelation, closes with the observation that 'the chief act of worship on earth, the holy eucharist, was made as closely as possible to resemble this adoration of the Lamb in heaven.' The argument for tradition is also founded on the New Testament. The authority we have cited says: 'During the forty days which intervened between the resurrection and ascension our Lord had constant intercourse with his apostles, and spoke to them of things pertaining to the kingdom of God, revealing to them, it may be inferred, details of the church's future polity and worship, which had been unnecessary while he was still with them in the flesh.' The comparative simplicity of primitive worship is explained by the secrecy and restraint to which the church was subjected through persecution. But the apostolical tradition, though not committed to writing, was preserved by the church, and on the accession of Constantine (the period commonly assigned for the commencement of the open decline of the church) 'it assumed its natural beauty and proportions.'

The argument for tradition is precisely analogous to that on which the Pharisees founded their amplifications of the law of Moses, so severely condemned by our Lord (see PHARISEES), and it is liable in application to the same abuses. If there is an authoritative unwritten standard, who is to tell what it is, and what may not be imposed by it? Even after the apostolical age we find a vision of angels communicating to Ignatius that ancient and innocent piece of ritual, the antiphonal chant.

Uniformity of ritual is not by any means an essential part of Ritualism. The views expressed on this subject are sufficiently liberal, all that seems to be required is that the essential features of Christian worship should be retained, and nothing commanded in Scripture, or derived from apostolic times, should be omitted. Details of worship not divinely instituted have, it is said, received the divine sanction. The creation of feast days, and the diversifying of the ceremonies observed on them, seems a legitimate mode of expansion.

In regard to particular observances, the general principle is laid down that divine service is to be regarded in the light of a sacrifice. The officiating minister occupies a double position: he is either the temporal deputy of his divine Master, or the minister offering in the name and on behalf of the people (one of the special distinctions of the Christian ritual is stated to be its tendency to level distinctions, on which account 'the equality of all before the altar' is held to be a protest against the alienation of classes. 'There is one class, however, to which this equality does not apply. Imposing ceremonies always impress the vulgar with a sentiment of respect for the ministrants purely depending on their official capacity, and if to this be added such claims to reverence as are implied in being regarded as the official representatives of the Deity, a priesthood (a term in which the Ritualists delight) in the most exclusive sense is established, and the equality of other classes becomes a mediæval equality of equal prostration at the feet of the pretended representatives of Heaven. That this view is not without practical effect in recommending Ritualism to a certain class among the clergy may easily be imagined, but whether such pretensions should be admitted on the ground of a tradition of which the clergy are themselves the custodians is what others have to consider. Thinking men as they are, an open door to superstition seems the inevitable consequence of accepting it, and such has hitherto been the general view in the church itself. In accordance with the first general principle above stated, a point of much importance is made of laying the offerings of the people on the altar as an oblation (see that word). In accordance with the second principle vestures and attitudes assume an adventitious importance. We shall not here go into what has been called the millinery department of the subject. The exposition of the due use of albs, stoles, chasubles, and equally of candles, incense, and other symbols, requires an intimate knowledge of this particular sphere of ecclesiastical typology, which only a profound faith in its fundamental principles could enable any one to acquire. A point of more importance is the adoration offered to the assumed presence of Christ in the eucharistic elements of bread and wine, hence the elevation of the host, and the whole train of popular superstitions which follow inevitably in the wake of acts of adoration manifestly bestowed upon material objects. The choral service is a point of much importance with the ritualists, as with all who value an æsthetic worship. Historically they, as well as others, contend that the whole service of the Church of England is intended to be choral, and is duly represented in the cathedral services. The word 'saying,' in the rubrics, is represented to be an ecclesiastical or technical expression for utterance in a plain tune, without elaborate inflections and intonations, which are understood by 'singing,' while 'reading' is a general term including both these methods.

The legal position of the Ritualists is that the first Book of Common Prayer, issued in the second year of Edward VI (1549, with alterations made in 1552, 1560, 1604, and 1662), is still the guide of the church in all matters connected with ritual. The present Prayer-book is not a complete manual, and it expressly refers in the opening rubric to the first Prayer-book of King Edward VI. It is also affirmed that according to acts 25 Henry VIII cap xix, and 1 Elizabeth, cap 1, the missals and service-books of the pre-Reformation Church are still binding, except in as far as they are inconsistent with the royal prerogative, contrary to common law, incompatible with the present Prayer-book, or expressly repealed. Various judgments have been given in the ecclesiastical

courts against extreme Ritualists, and the movement led to the passing of a special act of Parliament in 1874 (Public Worship Regulation Act), under which proceedings may be taken against what are deemed ritualistic practices. Such cases are usually brought before the Court of Arches, which is presided over by a secular judge, and several clergymen have been found guilty of ritualistic practices by this tribunal, and have undergone imprisonment as the result. In 1889-90 the Bishop of Lincoln was tried before the court of the Archbishop of Canterbury for ritualistic practices, and as a result the use of lights on the altar, the 'eastward position' (at the north end of the west side of the altar), and the use of wine mixed with water have been declared permissible.

RIVE DE GIER, a town of France, department of Loire, on the Gier, 12 miles N.E. of St Etienne. It is almost wholly of modern construction, and owes its growth to the coal field which surrounds it, the most valuable possessed by France. Lyons and many other important towns depend upon it for their supplies. It does not possess any ancient edifices of particular interest. There is a fine and richly ornamented modern chapel in the purest style of ogival art. The most important manufacture is that of glass, which is carried on to a great extent in numerous glass works, where, in addition to bottles and window glass, much fine crystal and stained fancy glass are produced. There are also manufactures of ribbons, thread, steel, files, and tools of various descriptions, and extensive spinning and other mills, foundries, machine, engine, and other iron works. Pop. (1896), 13,592.

RIVER HOG, the name occasionally given to the *Hydrocharus Capybara* or *Capybara*, a Rodent Mammal belonging to the family of the Cavidae or Guinea pigs. See CAPYBARA and the illustration at RODENTIA.

RIVER HORSE, a name sometimes given to the hippopotamus (which see).

RIVERS are always among the most beautiful, and when of a superior size among the grandest features of natural scenery. On this account, as well as from the innumerable benefits they confer, and their endless associations with all the other objects of interest in nature—mountains, plains, woods, vegetation, animal and insect life—they early formed an object of superstitious veneration, and have been worshipped in some form by almost every people, barbarous or refined. Rivers are traced to springs, or to the gradual meltings of the ice and snow which perpetually cover the summits of all the most elevated ranges of mountains upon the globe. Springs and ice are themselves due to the precipitation of water from the atmosphere in the form of snow, rain, mist, or dew. These fill the springs, lakes, or other reservoirs from which rivers flow by the natural gravitation of water to a lower level. The union of various springs, or of these meltings, forms rivulets; these last follow the declivity of the ground, and commonly fall at different stages into one great channel, called a *river*, which at last discharges its waters into the sea or some great inland lake. The declivities along which descend the various streams that flow into one particular river are called its *basin*—a term, therefore, which includes the whole extent of country from which the waters of the river are drawn. Rivers are swelled during their course by the rain which falls into their basins. In temperate climates this source of supply tends to greater equality in the volume of the river than in torrid regions, where the evaporation is great. In the former the rains are not only more equally distributed in point of time, but also form a more protracted source of supply, part of the rainfall sinks into the ground to

form springs, part forms rills which flow directly into the river, and part feeds those rills with the drainage of the saturated ground long after the rain has ceased. As mountainous regions abound in springs, we find that most rivers, more especially those of the first class, commence from a chain of mountains, each side of a chain also has its springs, and the rivers which originate on one side flow in the opposite direction to those which rise on the other. As it is the property of water to follow the most rapid descent that comes in its way, the courses of streams point out the various declivities of the earth's surface, and the line from which large rivers flow in contrary directions (the watershed) generally marks the highest parts of the earth. This line need not, however, be of any great height, in European Russia, for instance, where the rivers are very extensive, the line which separates their sources is very little above the level of the Baltic or of the Black Sea.

The size of a river depends upon two main circumstances—the extent and character of its basin, and the degree of humidity possessed by the climate of the region from which it draws its supplies, this again being often dependent upon prevalent winds blowing from the ocean (especially the *trade winds*). By an attention to these remarks the causes of the great size of the South American rivers will be apparent. The peculiar position of the Andes with respect to the rest of that continent, the fact that by very far the largest proportion of its running waters are drained off in one general direction (towards the Atlantic), and the humidity of the climate, all contribute to that result. The Andes being placed so near the coast of the Pacific, the rivers which flow from them into that ocean are small, while those which flow on the other side, having such an immense space to traverse, are swelled into a most majestic volume before they reach the Atlantic. The physical circumstances of the old continent are unfavourable to the accumulation of such vast bodies of water as the rivers of South America. Europe is not of sufficient extent, Africa is oppressed by a scorching climate, and abounds in sandy deserts, in Asia the atmosphere generally is not so moist, while the more central position, for the most part, of the great mountainous ranges of that continent, and the existence of capacious inland lakes, which are the final receptacles of the streams that fall into them, are the causes why the waters are more equally drained off in different directions than in the New World.

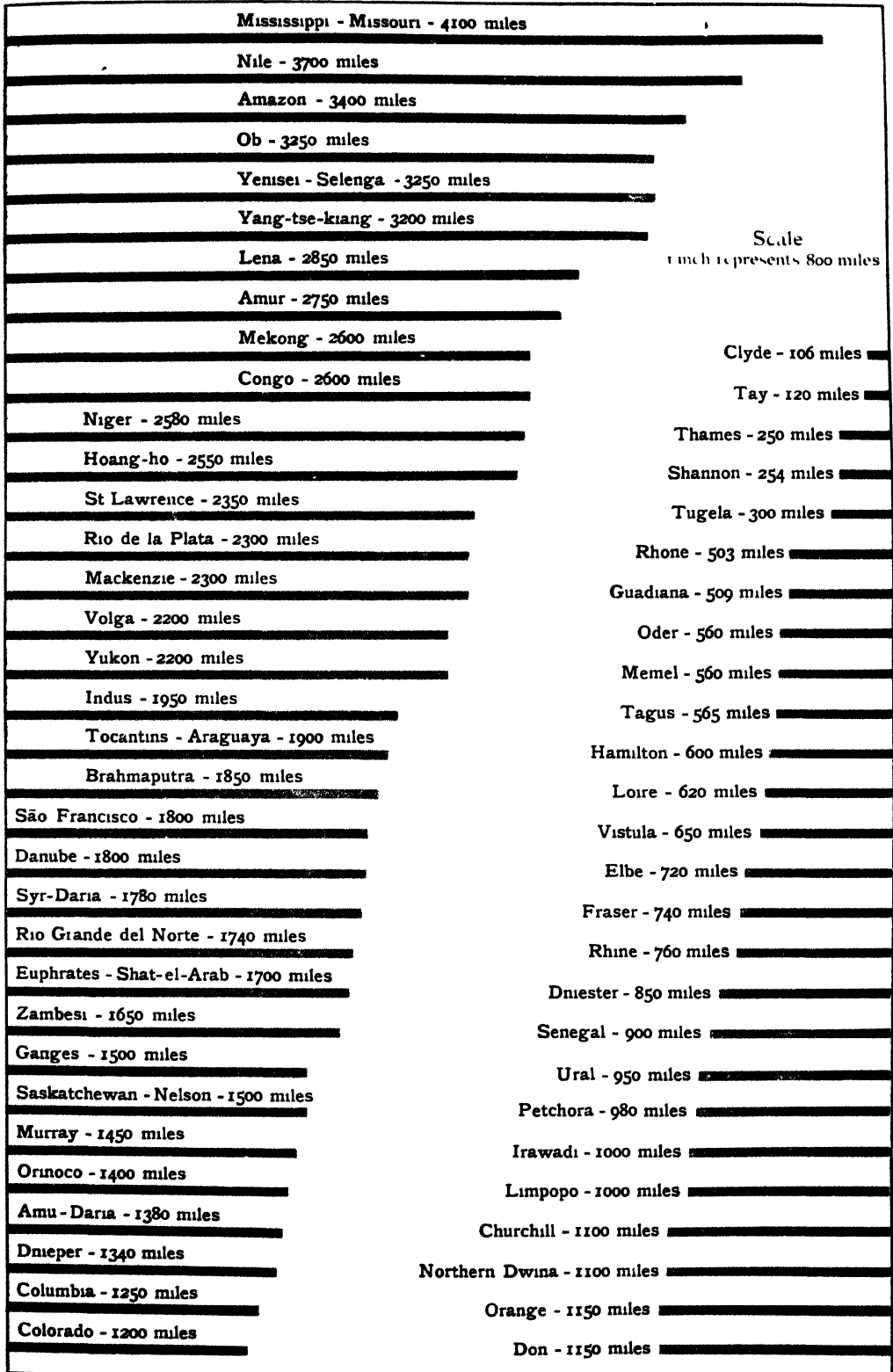
When water, by following a descent has once received an impulse, the pressure of the particles behind upon those before will be sufficient to keep the stream in motion, even when there is no longer a declivity in the ground. The only effect is that, in passing along a level, the course of the stream becomes gradually slower, an effect which may be perceived, more or less, in all running waters that originate in mountainous or hilly tracts and afterwards traverse the plains. The rate of fall of many great rivers is much less than might at first be supposed. The Marañon or Amazon has a descent of only $10\frac{1}{2}$ feet in 600 miles of its course—that is, one twenty-seventh part of an inch for every 1000 feet of that distance. The Loire in France, between Pouilly and Briare, falls 1 foot in 7500, but between Briare and Orleans only 1 foot in 13,596. Even the rapid Rhine has a descent of no more than 4 feet in 1 mile between Schaffhausen and Strasburg, and of 2 feet between the latter place and the borders of Holland. When rivers flow through a mountainous and rugged country they frequently fall over precipices and form *cataracts*, in some cases several hundred feet in depth. The most celebrated falls in the world are those of the Niagara, in North America.

In the tropical regions most of the rivers are subject to periodical overflowings of their banks in consequence of the rains which annually fall in such abundance in those countries during the wet season. The overflow of the Nile was considered by the ancients, who were ignorant of its cause, as one of the greatest mysteries of nature, because in Egypt, where the overflow takes place, rain hardly ever falls. The apparent mystery is easily explained by the circumstance of the rains descending upon the mountains in the interior of Africa, where the Nile rises. The consequent accumulation of the waters among the high grounds gradually swells the river along its whole extent, and in about two months from the commencement of the rains occasions those yearly inundations without which Egypt would be no better than a desert.

The erosive action of rivers on their beds is continually exercised, especially in the early part of their course, where the channel broadens as they approach the sea it may almost cease. Remarkable instances of erosive action are almost everywhere to be observed if we carefully examine the course of a river, but in no case is such action so striking as in the *canyons* or river gorges in the Colorado region of the United States. There the rivers have hollowed out for themselves courses that present almost perpendicular rock walls on either side, rising, it may be, to the height of 6000 feet for hundreds of miles on end. Such action is also often seen where there is a waterfall, in which case the water gradually wears away the rock at the place where the fall occurs, and thus causes the latter to recede, as is well known to be the case at the Falls of Niagara. In perhaps every case a river has had much to do with the formation of the valley in which it flows. Rivers are very permanent features in the earth's history, and in some cases have hollowed out a channel through a mountain range gradually elevated across their course.

Rivers, in their junction with the sea, present several appearances worthy of notice. The opposition which takes place between the tide and their own currents occasions, in many instances, the collection at their mouths of banks of sand or mud, called *bars*, on account of the obstruction which they offer to navigation. Some streams rush with such force into the sea that it is possible, for some distance, to distinguish their waters from those of the sea. The current of the majestic Amazon makes itself felt for a long distance out in the Atlantic. The effect of the rising tide in many cases produces the well known phenomenon of a *bore*. Many of the largest rivers mingle with the sea by means of a single outlet, while others (for instance, the Nile, the Ganges, the Volga, the Rhine, and the Orinoco) before their termination, divide into several branches. The triangular space formed by a river pouring itself into the sea by various mouths is called a *Delta*, from its resemblance to the shape of the fourth letter (Δ) of the Greek alphabet. This difference may depend upon the nature of the soil of the country through which a river runs, but it also frequently results from the velocity of a stream being so much diminished in its latter stage that even a slight obstacle in the ground has power to change its course, and a number of channels are thus produced. Another cause may be assigned for the division into branches of those rivers which, in tropical countries, periodically inundate the plains, the superfluous waters which at those periods spread over the country find various outlets, which are afterwards rendered permanent by the deepening of the channels by each successive flood. In some arid regions the rivers, owing to the nature of the

RIVERS



RELATIVE LENGTHS OF THE MORE IMPORTANT RIVERS OF THE WORLD

surface and the heat of the climate, after running a certain distance, are absorbed and evaporated, and thus never reach the sea. The rapidity of a river does not depend wholly on the inclination of its bed, it is also affected by the quantity of water contained in it, and the simultaneous velocity of the different parts of a river is not equal, the water at the bottom moves slower than at the surface, and at the sides than in the middle. In general, though the volume of water increases as the river approaches its mouth, the velocity diminishes on account of the diminution of the inclination of its bed.

The following are important works on rivers: Revy's *Hydraulics of Great Rivers* (Parana, Uruguay, and La Plata, 1874), Harcourt's *Treatise on Rivers and Canals* (1882), *Industrial Rivers of the United Kingdom* (1888), *Stevenson's Principles and Practice of River Engineering* (3rd edn 1886), *Wheeler's Tidal Rivers* (1893), *Partiot's Etude sur les Rivières à Marée et les Estuaires* (1892-94), *Berthot's Traité des Routes, Rivières et Canaux* (vol. II 1898). See the articles AMAZON, CONGO, MISSISSIPPI, MISSOURI, LAWRENCE (St.), DANUBE, RHINE, NILE, NIGER, GANGES, &c.

The following is a table of the principal rivers of the world with their estimated length, and the area of their basins (regarding both which authorities vary greatly) —

Eastern Hemisphere	Length in English stat. mil.	Area of Basin in sq. mil.
N. Atlantic system—		
Donna,	522	32,810
Niemen,	544	35,120
Vistula,	650	74,498
Elbe,	720	65,198
Oder,	560	43,212
Rhine,	760	86,600
Loire,	620	46,700
Douro or Douro,	490	30,494
Garonne and Gironde,	370	32,510
Seine,	440	30,108
Tagus,	505	12,038
Guadiana,	500	25,476
W. and S. African system—		
Congo,	2600	1,424,340
Niger,	2580	807,512
Zambesi,	1650	51,180
Mediterranean system—		
Nile,	3700	1,081,958
Po,	416	28,950
Rhone,	503	39,214
Rhodo,	470	32,424
European system—		
Dnieper,	1800	315,362
Dniester,	1340	203,422
Don,	1150	166,980
Dniester,	850	20,722
Arctic system—		
Obi,	3240	1,125,190
Yenisei—Selenga,	3240	905,000
Lena,	2850	895,520
Kolyma,	1110	213,679
Dwina,	1100	140,890
Indigirka,	650	152,963
Oknek,	848	137,299
Anadi,	292	112,454
Petchora,	980	127,280
Mesen,	544	30,401
Continental system—		
Volga, } Caspian,	2200	503,174
Ural, } Caspian,	950	96,500
Kur, } Caspian,	746	85,896
Syr Daria, } Aral Sea,	1780	109,080
Amu Daria, } Aral Sea,	1340	173,700
Lob Lake system,	1260	235,364
Pacific system—		
Amur,	2750	775,860
Yangtze Kiang,	3200	685,150
Hoang ho,	2550	378,260
Si Kiang,	1120	131,800
Indian Ocean—		
Ganges, with basin of Brahmaputra,	1850	667,780
Irawadi,	1000	440,110

Indus,	1950	370,580
Menam,	1006	287,028
Euphrates—Shat-el-Arab,	1700	129,310
Godavari,	872	123,326
Kistna,	800	108,533

AMERICA—

Atlantic Ocean—

Amazon,	3400	2,721,300
La Plata—Paraná,	2300	1,198,144
Tocantins—Araguaya,	1900	377,926
Orinoco,	1400	364,984
Great Lakes and St. Lawrence,	2350	481,724
Sao Francisco,	1800	218,858
Paranahyba,	950	135,000
Essequibo,	490	71,648
Delaware,	310	11,622
Connecticut,	310	10,630

Gulf of Mexico and Caribbean Sea (American Mediterranean)—

Mississippi—Missouri,	4100	1,240,000
Rio Grande del Norte,	1740	220,020
Magdalena,	960	96,076

Arctic system—

Mackenzie,	2300	640,760
Saskatchewan—Nelson,	1500	416,980
Churchill,	1100	97,802
Albany,	650	70,142

Pacific system—

Columbia,	1250	252,390
Colorado,	1200	227,740
Yukon,	2200	315,362

RIVERS LAW OF. The maxims of law which apply to rivers in England and Scotland are nearly identical. Navigable rivers are held to be the property of the crown, non navigable rivers belong to the proprietors through whose grounds they flow. As rivers may pass through the estates of successive proprietors, and may form boundaries between different estates, various competitive claims arise which require adjustment, and these are arranged on principles of natural justice. The proprietors on opposite banks of a river are supposed to own the ground over which it flows respectively to the centre of its bed, and may fish it accordingly. They do not own the water, the property in which is shared by the owners above and below. A particular proprietor cannot dam up the water so as to make it flow back, or divert it to prevent it from flowing down, so as injuriously to affect other owners. Each proprietor may embank for his own protection, but not so as to throw the water over on an opposite proprietor. No one has a right to pollute or poison the water, yet the pollution of a stream may be allowed by general consent, or by prescription which assumes it. The period of prescription in England is fixed at twenty years. In Scotland it is doubtful whether a single or double term of prescription, twenty or forty years, may apply in particular cases. The public have also general rights in rivers, though not navigable, but these are vague when not determined by statute. An act to prevent the pollution of rivers was passed in 1876.

RIVET is the metal pin by which two plates of metal or other flat or close fitting pieces of any manufactured article are held together. Rivets are used of a great variety of sizes, and for innumerable mechanical purposes, from fastening a clasp on a leather purse to holding together the plates of iron ships and steam engine boilers. Rivets are usually made with a head on one end, while the other end is fastened after passing it through the pieces to be united together, which are pierced to receive it, by hammering it flat. In fixing the larger rivets a machine is used, which holds the head of the rivet with a powerful lever while the other end is fastened. In riveting boiler plates the rivets are hammered red hot, and in contracting as they cool draw the plates together with a force proportioned to the tenacity of the metal of which the rivets are made.

RIVIERA, a name given to the Mediterranean coast on each side of the town of Genoa, partly in France, partly in Italy. It extends to Spezzia on the east and Nice on the west, and is a favourite winter resort of invalids and others. The whole coast is traversed by a road begun by Napoleon, and completed by the Sardinian government, and by a railway completed in 1874.

RIVOLI, a town in Italy, beautifully situated on the last slopes of the Alps, in the province and 8 miles west of Turin. It is well built, consists of several handsome streets and a large square, and has a royal castle, two parish churches, several suppressed monasteries, a court of justice, and an hospital. The manufactures are woollens, ribbons, and macaroni. The environs are studded with villas belonging to the inhabitants of Turin, with which it is connected by a magnificent planted avenue. Pop 5540.

RIVOLI, DUKE OF. See MASSENA.

RIVOLI VERONESE, a village of Italy, province of Verona, 14 miles north west of Verona, between Lake Garda and the right bank of the Adige, near the imperial road leading from Trent to Verona, with 1067 inhabitants, where Napoleon defeated Alvincz, on 14th January, 1797.

RIX DOLLAR, the English way of writing the names of different silver coins used in various Continental states, as the *rigsdaler* of Denmark = 2s 2½d, the Swedish *rikdaler* = 1s 1½d.

RIZZIO (or RICCIO), DAVID, the son of a professor of music and dancing at Turin, in which town he was born in the earlier part of the sixteenth century. His musical abilities procured him notice at the court of Savoy, while his talents as a linguist caused him to be selected by the ambassador from the grand duke to Mary Queen of Scots as a part of his suite. In 1564 he first made his appearance at Holyrood House, where he soon became so great a favourite with the queen that he was appointed her secretary for foreign languages. (See MARY STUART.) The distinction with which he was treated by his mistress soon excited the envy of the nobles and the jealousy of Darnley, the hatred of the former being increased as much by the religion as by the arrogant deportment of the new favourite, while the suspicions of the latter were excited by his address and accomplishments. A conspiracy, with the king at its head, was formed for his destruction, and before he had enjoyed two years of court favour the Lord Ruthven and others of his party were introduced by Darnley into the queen's apartment, where they despatched the object of their revenge, 9th March, 1566. Popular tradition assigns to Rizzio the improvement of the Scottish style of music. His skill in the performance of the national melodies on his favourite instrument, the lute, tended not a little to their general cultivation and popularity with the higher classes. But it is evident that the style of Scottish music was determined long before the time of Mary, and many of the airs which have been ascribed to Rizzio are easily traced to more distant periods.

ROACH (*Leuciscus ulna*), a species of fresh water Teleostean Fishes belonging to the Carp family (Cyprinidae), and included in the genus *Leuciscus*, the members of which (numbering among others the Dace, Chub, and Bleak) are noted for the silvery hue or lustre of their bodies. The Roach has long been noted as an angler's fish, and as one requiring much skill to capture it, on account of its shy capricious habits and tastes. They seem especially susceptible to weather changes. These fishes are gregarious in habits. They rarely attain a large size, a length of about 9 or 10 inches, and a weight of about 1 lb, being considered a fair average. The colours are very beautifully disposed and blended. The pectoral,

ventral, and anal fins are of a bright red colour, those of the back and tail being of a browner hue. The head and body on their upper surfaces are coloured of a grayish-green glossed with blue tints. The belly is of a silvery white lustre, whilst the sides gradually merge downwards from the darker hues of the back to the lighter lustres of the abdomen.

ROADS are artificial pathways formed through a country for the accommodation of travellers and the carriage of commodities. The opening up of a country by roads is one of the most important steps in civilization. The demand for roads is created at a very early stage in civilized life. It may even be said to precede civilization, as the desire of social intercourse is all that is needed to originate it, yet, from a variety of causes, the full satisfaction of this demand is one of the slowest processes in the history of human improvement, and a completely developed system of roads may be regarded as one of the crowning triumphs of civilization.

Among the causes which have retarded the realization of this ideal, the principal may be reckoned to be the very great amount of science necessary to overcome the natural difficulties of road making, the great expense of keeping and maintaining roads, and the disturbance of all peaceful enterprise and social progress resulting from international jealousies and wars, and from civil and political contentions and rivalries.

As among roads we must include railways, it will easily be seen that the perfection of road making makes large demands upon science, but if we take merely common highways, no small expenditure of time and ingenuity is needed to supply them in countries presenting natural difficulties, and if we consider merely the incessant action of the weather, the maintenance of roads in an efficient state will appear to be a work of incessant industry, and the expense of maintenance a serious burden on a disturbed country with an ill organized system of labour. The third cause to which we have alluded, war in all forms, has certainly operated prejudicially on the development of roads, notwithstanding that roads are of great value in military science, and that conquerors in particular have ever been assiduous in constructing them, for the few great roads necessary to open up a country for conquest and permanent subjugation are but a poor substitute for the innumerable channels of communication, lesser and greater, which spontaneously arise through the incessant demands of successful industry. Nevertheless in road making no people has acquired greater renown than the Romans. The Greeks had already paid much attention to road making, but the Romans appear to have acquired the art from the Carthaginians, and they not only applied it at once in Rome and throughout Italy, but subsequently extended it with their conquests through the civilized world. The Roman roads were models of engineering skill, admirable alike for capacity and durability.

During the reign of feudalism the making and maintaining of roads was cast as a burden, in form of forced contributions of labour, on the common class of people or villains of the country through which the road passed, and the maintenance of roads is still commonly treated as a local burden. The common highways in Great Britain have on the whole not been constructed on any comprehensive system, but have rather grown through use and wont, developing in successive stages from foot-paths to bye-ways, and from bye-ways to highways. This haphazard mode of growth is not without serious disadvantages, and has led to the frequent violation of sound engineering principles. The maintenance of the roads has also, from want of a general and com-

prehensive system, given rise to complications and questions of very difficult adjustment.

The introduction of railways has not, as might have been supposed, tended to diminish the importance of the common highways, but rather, through the great growth of traffic which they have occasioned, to increase it. Means of communication, like the necessities of life, may be classed among commodities which create their own demand. The superior engineering skill which railways call into existence and support is also favourable to the improvement of highways.

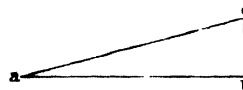
We may here give some general principles of road-making, referring to the articles MACADAMIZATION, PAVEMENT, and RAILWAYS for the special branches of the subject to which they refer. Road making also includes special contrivances for overcoming particular difficulties, as embankments, bridges, viaducts, tunnels, &c., to which, as they are specially dealt with elsewhere, we shall not here allude.

The first important point to be considered in making a road is the route to be followed. In determining this a variety of conditions have to be taken into account, and these are often so difficult to bring to a common standard of comparison, that the actual decision can only be arrived at by a compromise. The conditions which, by their contrast, cause this difficulty range themselves under two classes—expense of making and maintenance, and facilities of use. The primary expense of an undertaking of this nature involves considerations of the most complicated kind. If the expense is to be defrayed at once, present convenience only must be consulted in the construction, or a burden will be entailed disproportionate to the advantage obtained, and similar undertakings will be unduly discouraged. But it is evident that this would be in the end at once the most expensive and the least advantageous method of procedure in road making, and that it would never allow a single step of advance to be made from the most primitive modes of construction. If, on the other hand, a permanent burden is to be created, future use must be considered, and the development of traffic estimated, which may arise out of circumstances which the facilities about to be granted may themselves create. Thus the most economical course to be followed may depend upon considerations of the most speculative kind, involving abundant liability to error both on the side of over caution and of too great boldness.

The practical question involved in the respective facilities of different routes also presents numerous complications. There have to be considered, first, the nearest practical approach to a direct route between the terminal points to be united, secondly, the deviations that may be permitted in order to take in intermediate places, involving the respective advantages of cross roads and deviations. The question of directness of route is complicated with cost of construction, and frequently immediate and ultimate advantage are at variance in determining it. The main difficulties involved in the question itself arise from natural obstructions and inequalities of level. Natural obstructions are overcome by engineering appliances to which we have already adverted. The normal difficulty is inequality of level, which is almost always treated by way of compromise, being partly met by engineering appliances and partly evaded.

This method of treatment is dictated partly by the consideration of expense, and partly by the nature of the difficulties themselves, which are introduced by diversities of level. If we take, first, the route itself, we find two places to be united which are on a different level. No evasion can overcome this part

of the difficulty, but on the most direct route between these places there may be undulations of territory which can be evaded by taking a longer route. The advantages of doing this depend for the most part not upon the route itself, but upon the kind of traction used on it. If the force by which the more ponderous commodities are drawn along a road could be freely applied, that is, if it could be exactly proportioned at each moment to the resistance to be overcome, there would be comparatively little advantage to be gained by deviations of route to avoid diversities of level. When a road pursues an incline the force needed to carry a load up it may be divided into two parts—the force of traction or propulsion as applied horizontally, and the force of elevation, to which, if the incline is



steep, has to be added that of support. On the road *ac*, the force needed to carry a load from the lower extre-

mity to the higher is equal to the force required to carry it along the horizontal line *ab*, together with that needed to raise it vertically from *b* to *c*. Hence if force could be applied freely, the expediency of evading diversities of level, when not so great as to involve the question of support, would resolve itself simply into the question, What extent of horizontal traction would equal a given extent of vertical elevation? But the force employed in drawing loads on common roads is animals, and the load an animal has to draw is adjusted to its normal strength. If the strength of the animal is measured by its power of horizontal traction, when it has to pull a load up hill it must put forth extra exertion, which will exhaust its strength in more than the normal ratio to the work performed. If, on the other hand, the load is adjusted to the hill work, the strength of the animal will only be partially used on level ground. Unequal roads thus entail either spasmodic exertion or unemployed strength, and in either case there is a waste of force. For the sake of the animals, then, it is desirable that inequalities of level should be avoided on a road as much as possible, and in calculating the amount of engineering expense which is entailed by levelling, the permanent advantages acquired by it must always be taken into account. The consideration now adduced is that which determines road engineers in their calculations to fix the degree of inclination of a road, when diversities of level are necessary, at the lowest possible point. From a calculation of the loss of power in ascending gradients, it is found that in an ascent of 1 in 50 the force exerted to carry a load a given distance is twice that required on a level road, and that on an ascent of 1 in 100 the force required is one and a half time that required on the level road. If, therefore, the same distances were traversed in equal times the horse would require to put forth the normal exertion of one and a half horse in the latter case, and of two in the former, but as more time is expended in the ascent, the amount of extra exertion needed falls within this limit. It is calculated that a horse can for a brief period put forth double its ordinary exertions. On these and similar considerations the maximum inclination of an ordinary road may be determined. It was estimated by Telford at 1 in 24, but except in extreme cases it is considered better that it should not exceed 1 in 50. When the extreme of inclination is reached, another point has to be considered, which has been already adverted to, the angle of repose, or the maximum of slope on which a carriage will stand without support. This has been calculated by Dr Lardner, on a smooth hard road, at 1 in 40.

After the route the width of a road is the most

important point to be determined. Here expense and present and future convenience have again to be weighed against each other. The point which it is most essential to bear in mind in deciding this is, that while the expense of making a road is nearly in the ratio of its width, the expense of maintaining it is not in proportion to the width of the road, but to the amount of traffic it maintains. If the road is broader the traffic will be more distributed, and the wear of the road will be less. The width ought to be a multiple of the breadth of the carriage by which the road is ordinarily to be traversed, with a small margin allowed for the passage of vehicles.

A road, besides a foundation, consists of two sections taken vertically—an under and upper way. The foundation may either be the natural surface of the ground, or it may be formed by cutting or embankment. The foundation must in the first place be supplied with drains. If necessary it should be solidified by rolling. When a good foundation is obtained, the laying of a base gives durability to the road. The best material for this is concrete made of gravel and lime. The object of this is to preserve the prepared foundation in the state of dryness necessary to the preservation of the road. Upon this base or subway the actual roadway is laid, which may be a pavement or a macadamized road. These have been already described under the respective heads. Transversely the road should be as nearly level as possible, but for the purpose of drainage a slight inclination is needed. This is best provided by making the sides run in straight lines, with a slight incline upwards towards the centre, and meet at the crown in a segment of a circle.

It may here be mentioned that the reform effected by Macadam was chiefly on the roadway or surface covering of roads. It had been customary before his time to use broken stones of different sizes to form the roadway. The consequence was that in course of time the smaller stones sunk between the interstices of the larger, which were raised to the surface, making the road rough and dangerous to vehicles. Macadam introduced the principle of using stones of uniform size from top to bottom, the dimension found most convenient being about an inch each way.

From what has been said on the value of roads, and the financial aspects of their construction and maintenance, it seems a natural conclusion that the maintenance of roads throughout a country should be a national undertaking. The case of towns is exceptional, and presents comparatively little difficulty. Where there is a municipal government the streets of a town of any importance will generally be tolerably well kept. The maintenance of good roads throughout the country comes home most directly to the agricultural classes, including landlords and tenants, and upon them the local burden of their maintenance naturally falls. But agriculturists, though most immediately, are not exclusively interested in the maintenance of good roads. The whole development of the country's resources and its general prosperity largely depends upon it. Agriculturists possess only a share of the capital of the country, they have their own interests to look to, and their own burdens to bear, but if through any local shortsightedness the roads in a single district of the country are neglected, the whole country suffers. It would seem, therefore, that however the incidence of taxation necessary for the maintenance of roads should be directed, the control of so general an interest ought not to be left wholly to their care. On the other hand, the superior knowledge of its own wants which each locality possesses seems to indicate the necessity of a local initiative, together

with a general supervision. This is, in principle at least, recognized by our law, although the general superintendence is exercised by the legislature alone, which intrusts the execution of its enactments to local authorities and not to the general executive.

ROADS, PUBLIC, or HIGHWAYS. Highways are public roads which every subject has a right to use. They are constituted by prescription, by act of Parliament, or by dedication to the public use. The liability to keep highways in repair, however they originate, falls generally on the respective parishes through which they pass, sometimes, however, it falls on particular townships, or on individuals in whose estates the roads lie.

Highways are regulated in England by act 5 and 6 William IV cap 1, amended by 4 and 5 Victoria, cap li and lix., 8 and 9 Victoria, cap lxxi., 25 and 26 Victoria, cap lxi., 27 and 28 Victoria, cap cl., and 41 and 42 Victoria, cap lxxvii., which are consolidated under the general title of Highway Acts, the first being known as the principal act. This act is applicable to all roads other than turnpike roads (or those maintained by the levying of tolls), and other roads regulated by local acts. It provides for the appointment of surveyors of highways, to be annually elected by each parish maintaining its own highways. Parishes may also be formed into districts, with a single surveyor. Parishes exceeding 5000 inhabitants may form boards. The boards or surveyors are empowered to collect rates, and are bound to maintain the highways in their districts, subject to the control of the justices, before whom appeals may be laid, according to the forms of procedure provided in the act. Powers are given to justices in general or quarter sessions to divide their counties into highway districts, or to constitute the whole county into such a district. Such districts are not to be formed where the highways are under the superintendence of a board formed under the principal act, or under the Public Health Act in boroughs or parishes having local acts, without their consent. Any parish or place having a known legal boundary in which there are no highways, or where they are maintained at the expense of any person or corporate body, or from funds other than a highway rate, is to be deemed a place separately maintaining its own highways. There are still a certain number of turnpike roads regulated by certain general statutes as well as by local acts, which authorize the levying of tolls on the traffic passing over them, and by which they are placed under the management of trustees or commissioners. This mode of maintaining roads, which was formerly common, has been latterly much restricted in the area of its operation, and is being gradually abandoned. Little change in the management of the roads has been introduced by the Local Government Act of 1888.

In Scotland the highways (except in burghs) are under county boards consisting of members of the County Council since 1890, when the Local Government Act took effect. Their management before this was settled by the Roads and Bridges Act, 1878, consolidating former statutes. The consolidation of the Scotch acts into a general act and the abolition of tolls had long been contemplated. In several of the counties there never were tolls, in others they had long been abolished. By the act of 1878 they were abolished everywhere in 1883.

Rule of the Road.—In meeting a carriage or horse, keep to the left, in overtaking, keep to the right, in crossing, bear to the left and pass behind. There are, however, exceptions in favour of tramway cars and led horses. The use of steam locomotives on public roads is regulated by several of the above acts. These regulations, however, do not apply to

motor-cars propelled by mechanical power, for which special regulations were enacted in the Light Locomotives Act of 1896

ROAD STEAMERS See LOCOMOTIVE.

ROANNE, a town in France, department of the Loire, on the left bank of the Loire, which is here navigable, and crossed by a handsome bridge, 29 miles north of Montbrison. It is well built, and has a fine quay, a communal college, a public library, theatre, and hospital. The manufactures are woollen, linen, and cotton goods, glue, oil, and earthenware, and the trade, both general and transit, is extensive, the latter chiefly coal from the Loire coal field. Pop. in 1886, 29,355, in 1896, 32,321, in 1901, 34,568.

ROANOKE, a river, United States, in Virginia and North Carolina. It is formed by the confluence of the Staunton and Dan, flows chiefly south-east, and after a course of about 300 miles falls into Albemarle Sound. It is navigable and tidal for 75 miles to the Falls of Halifax, and by a canal round the falls the navigation has been opened for barges to the junction of the Staunton and Dan, both of which are navigable some distance for boats of 5 tons.

ROARING, in horses, is a disease of the larynx or windpipe, in which the passage of the air is partially obstructed, giving rise, when the horse is briskly exercised, to the peculiar sound from which the disease derives its name. The cause of the disease is usually supposed to be inflammation of the part, the fluid discharged from which, changing into a tough, viscid substance, adheres to the larynx and upper part of the windpipe and obstructs the passage. On examination after death bands have been found across the windpipe, or some parts of the air tube have been found thick and inelastic, or the shape of the upper windpipe deformed, but sometimes there have been no abnormal appearances. The causes of roaring are therefore various. It sometimes follows strangles. Carriage horses are more subject to roaring than saddle-horses, and this is explained by the injury done to the larynx by tight reining. Roaring is not detected by moderate exercise, but galloping or brisk trotting, especially up hill, quickly manifests it. There are various kinds of roaring, distinguished by the sounds the animals emit, as whistling, wheezing, high-blowing, and piping. Roaring does not appear to be amenable to treatment, though in early stages, as when it proceeds from catarrh or influenza, it may be relieved by blisters or setons. The disease renders a horse unsound, as it unfits him for the ordinary strain of work.

ROASTING is the cooking of meat by the direct action of fire—that is, by dry heat, either before the fire or in an oven. Roasting before an open fire is considered preferable to roasting in an oven, which is analogous to baking, on account of the free ventilation to which it exposes the meat during the process. Roasting and baking are among the most primitive modes of cookery, the rudest apparatus sufficing for them. Meat is roasted by savages by suspending it before or over a fire kindled in the open air. It is baked by kindling a fire in a hole in the ground, and placing the meat in the same hole after the fire has been removed, and covering it over until it is cooked.

The apparatus in most kitchens for open roasting are a fire, a spit, a contrivance for turning the meat to present all sides of it alternately to the fire, a screen to economize the heat, and a sauce-pan to catch the dripping. For roasting joints of different sizes, the grate must be capable of adjustment, as the size of the fire ought to be proportioned to that of the joint. It should extend beyond it on each side, and at top and bottom, so that the whole may be equally exposed to the heat. The larger the fire, the further the joint

should be placed from it. The fire must be kept even and bright throughout, and care must be taken to place the dripping-pan so that it may catch all the dripping, and be kept clear of dust and ashes. During the process of roasting, the meat should be basted with the dripping, to keep it soft and allow the heat to penetrate. When this is done the meat is cooked better and in less time.

According to Soyer and Liebig the meat should at first be put close to the fire to coagulate the albumen, and prevent it from escaping in a fluid state, and then removed to a greater distance. Dr. Walsh objects to this before an open fire, because it is impossible, without scorching the meat, to raise the surface to the coagulating point of albumen until the whole mass is above 150°. He therefore recommends the old plan of placing the joint first at a greater distance from the fire, and gradually bringing it nearer. With a very large fire the meat may be placed at first 15 inches off, 10 to 12 is an average distance, and with small joints 6 to 7. The heat to which meat is subjected in roasting is much greater than in boiling. It is estimated at from 350° to 600° Fahr.

The specialty of roasting as compared with boiling is that it retains the saline ingredients of the meat. Hence probably its more agreeable flavour, as well as its superior nutritive and digestible qualities. According to Dr. Walsh there is no loss in roasting except of water. The gravy, the dripping, and the meat itself contain all the nourishment which the joint contained beforehand. On the other hand, it is said that a dry heat destroys or converts into a horny substance the nutritive matter of bones, so that while raw bones give much nutritive matter to soup, the bones of roasted beef are comparatively worthless. Gristly and tendinous meat ought not to be roasted. The time allowed for roasting is roughly estimated at a quarter of an hour to 1 lb of meat. Longer time is required in winter than in summer, and for new than for old killed meat.

ROASTING-JACK See JACK.

ROBBERY, a felonious and forcible taking away another man's goods or money from his person, presence, or estate by violence or putting him in fear. Violence or intimidation is the criterion which distinguishes robbery from other larcenies, yet this does not imply any great degree of affright in the person robbed. It is sufficient that so much force or threatening, by word or gesture, is used as might create an apprehension of danger, so as to lead a man to part with his property against his will. If a thief, having once taken a purse, returns it, still it is a robbery. Highway robbery, or the forcible taking of property from travellers, in many countries is a capital offence, and in all civilized countries is severely punished.

ROBERT I. See BRUCE (ROBERT).

ROBERT II, King of Scotland, was the son of Marjory, daughter of Robert Bruce, and of Walter, steward of Scotland. He was born 2d March, 1316, and was recognized by Parliament in 1318 as heir to the crown. A son was subsequently born to King Robert, who succeeded him by the title of David II. (1329). In 1333 Robert, as steward of Scotland, was one of the leaders of the Scots at Halidon Hill. In 1334 he was appointed joint regent with Moray, and on the death of the latter was appointed sole regent in 1338. He conducted the retreat of the Scots after the battle of Neville's Cross (1346), where King David was taken prisoner, and was again appointed regent during the captivity of the monarch. After the return of David (1357) the steward became the head of the national party, the king having lent himself to negotiations for diverting the succession to a son of Edward. In 1363, after the design of David had been openly submitted to Parliament the stew-

ard and his party rose in arms against him. Terms were come to which prevented a civil war, the steward renounced his engagements with his confederates, who agreed to lay down their arms, while the king recognized his title to the succession. Soon after, David married a woman of low rank, Margaret Logic, and on a disagreement with the king, the steward with his son were cast into prison, and only liberated in 1369, after the divorce of the king. On the death of David he succeeded to the throne, and was crowned at Seone, 26th March, 1371, being thus the first monarch of the Steward, Stewart, or Stuart dynasty. The progenitor of the family in Scotland was Walter Fitzalan of Oswestry, Shropshire, upon whom David I. conferred extensive estates and the hereditary office of Steward. The same year Robert ratified a defensive treaty with France. A truce existed with England, but private hostilities were carried on on both sides with great freedom. The Duke of Lancaster invaded Scotland in 1380, but a renewal of the truce was agreed on. It expired in 1385, when war was immediately renewed, notwithstanding the repugnance of the king, by the turbulent Scotch nobles. Mutual invasion of the two countries took place, and after the Scotch, with French auxiliaries, had ravaged the northern countries of England, Richard II., by way of reprisal, crossed the border with a powerful army and burned Edinburgh. The Scotch raids into England were, however, continued without intermission, and even Ireland was invaded by Sir William Douglas, who on his return joined his father in an invasion of England, which led to the battle of Otterbourne, the most celebrated military exploit of this reign. Soon after this event the king, whose age and growing disinclination for business had long incapacitated him for controlling the turbulent kingdom, retired from the management of affairs, which was intrusted to his second son, the Duke of Albany (1389). He died on April 19, 1390, at Dundonald, Ayrshire.

ROBERT III., King of Scotland, originally John earl of Carrick, eldest son of Robert II., changed his name on his coronation. 14th August, 1390, to Robert. He was born about 1337. Having been lamed by an accident, he was unable to engage in military pursuits and he trusted the management of affairs almost entirely to his brother, the Duke of Albany. In 1398 Albany was compelled to resign his office by a party who wished to confer it on the king's eldest son, David, duke of Rothesay. War was renewed with England and the last invasion of Scotland by an English king (Henry IV.) took place in 1400. It was unattended by any important result. The dissolute character of the Duke of Rothesay induced the king to permit Albany to put him under arrest. He was imprisoned in Falkland Castle, where he was, according to common accounts, starved to death in 1402. The battle of Homildon Hill, 14th September, 1402, resulted in a disastrous defeat of the Scots and the captivity of many of their nobles, but the latter circumstance tended to the promotion of pacific relations with England. Dread of Albany, who had recovered the regency, induced the king to send his second son James (afterwards James I.) to France, but the vessel which carried him was captured by the English, and he was taken to London, where Henry detained him as a prisoner (1406). Soon after this event Robert died at Dundonald, 4th April, 1406.

ROBERT I., Duke of Normandy, surnamed *the Magnificent and the Devil*, was the younger son of Duke Richard II. by his marriage with Judith, a daughter of Count Godfrey of Brittany. In 1027 he succeeded his elder brother, Richard III., whom he is charged with having poisoned. The first years

of his government were employed in bringing his rebellious vassals into subjection. Bold and adventurous, he disdained to enter into any negotiation with the revolters, but fought stoutly against them and took their strong castles and pillaged them. The town of Evreux he wrested from his uncle Robert, archbishop of Rouen, and he compelled the Bishop of Bayeux to submit to his mercy. After he had brought his own territories to subjection he proceeded to foreign undertakings. Count Baldwin of Flanders, whom his own son had expelled, he brought back to his states. He also assisted Henry I., king of France, whom his mother Constantia actively opposed, and humbled Count Otho of Champagne. King Henry wished to reward him for his service, and gave him the district of Vexin, a present which afterwards led to serious quarrels between the Norman dukes and the French monarchs. After returning to his states he proceeded against Alain, duke of Brittany, defeated him and made him one of his vassals. In 1031 he wished to go to England to support his two nephews, Alfred and Edward, whom Canute, king of Denmark, had excluded from the succession to the English throne, but his fleet was wrecked on the island of Jersey. Hereupon he concluded a truce with Canute by which the two princes were promised the half of England. In the height of his success he felt remorse for the sins of his youth and the cruelties which he had practised on the conquered, and he resolved to visit the holy places. After he had provided for the government of his states he set out in 1033, and proceeded with a great retinue through Italy for Rome. The following year he took shipping for Constantinople, from which he made the pilgrimage to Jerusalem on foot. While returning he died suddenly at Nicæa in 1035, and is supposed to have been poisoned by his servants. His only son, William, who was illegitimate, and had the daughter of a furrier of Falaise for his mother, succeeded him, and afterwards became the conqueror of England. His invincibility, vigour, and power have probably given him his surname, while his heroic deeds and penance have given rise to numerous stories. In 1496 there appeared at Paris a romance entitled *La Vie du Terrible Roi le Diable le quel fut apres l'homme de Dieu*. This had numerous editions and imitations, which had no resemblance to the true history. They form the groundwork of Scarron's text to Molière's opera.

ROBERT OF GLOUCESTER, an English historian is supposed to have been a monk in the abbey of Gloucester, but of his private history nothing is known. His history of England extends from the fabulous Brutus to about A.D. 1300. The work shows the transition stage of the language previous to Chaucer, and its chief value is linguistic. It is in verse and contains upwards of 10,000 lines. Numerous manuscripts prove its popularity. These are found in the Bodleian, the Cottonian, the Herald's College, and other libraries. It was printed by Thomas Heame at Oxford in 1724, but the best edition is that of Dr. Aldis Wright in the Rolls series (two vols. 1887). Robert of Gloucester's chronicle, partly based on earlier works, is wholly destitute of art or imagination. Some have thought it a translation from the French.

ROBERTS, DAVID R.A., painter, was born in Edinburgh in 1796. He was apprenticed to a house painter but with a view to the higher branches of his art he pursued the study of drawing and painting. After a seven years' apprenticeship he became assistant scene painter at the Pantheon, a second-class artist. In the following year he was appointed principal painter to the Theatre Royal Glasgow, and in 1820 he obtained the same appointment at

the Theatre Royal, Edinburgh. About the close of the following year he was engaged as scene-painter for Drury Lane Theatre, where he had as his colleague Clarkson Stanfield, with whom he formed a life long friendship. In 1826 he exhibited in the Royal Academy views of the Cathedrals of Rouen and Amiens. Soon after he abandoned scene-painting, and in 1832-33 he visited Spain in search of subjects for his pencil. A folio volume of tinted lithographs from his Spanish sketches widely extended his reputation. From 1835-38 he furnished the drawings for the four annual volumes of *Jenning's Landscape Annual*. The views were taken in the various provinces of Spain and in Morocco, and the engravings from them were executed in the choicest style. He also at this period furnished the drawings for Sir Bulwer Lytton's *Pilgrims of the Rhine*. He had become vice-president of the Society of British Artists, but having resigned this position he was elected an associate of the Royal Academy in 1839, and an academician in 1841. As the result of a protracted visit to the East he produced a rich pictorial work in four folio volumes, entitled *The Holy Land, Syria, Idumea, Arabia, Egypt, and Nubia*, the first volume of which appeared in 1842. For a succession of years the pictures connected with his tour were exhibited in the Academy from 1840 to 1845, and in 1848 he exhibited the *Chancel of the Collegiate Church of St Paul, Antwerp*, which has become the property of the nation. His well known picture the *Destruction of Jerusalem* appeared in 1849. The architecture of Belgium, Vienna, Verona, and Venice subsequently occupied his pencil. In 1853 appeared *The Inauguration of the Exhibition of all Nations*, and in 1855 *Rome*, one of his best pictures. *Christmas Day and St Peter's at Rome* appeared in 1856. Numerous other Italian subjects followed, while in his later years he occupied himself with subjects in and around London. He had formed an engagement for a series of pictures on metropolitan subjects, and had begun to execute them, but this project was arrested by his sudden death by apoplexy, 25th November, 1864. Roberts is considered the best architectural painter this country has produced, and as a painter of interiors he has few equals even on the Continent.

ROBERTSON, FREDERICK WILLIAM, a celebrated preacher, was born in London 3d February, 1816. He attended the grammar school of Beverley, and in 1830 became a pupil of the Edinburgh Academy, and afterwards attended the university of that city. In 1833 he was articled to a solicitor in Bury St. Edmunds. He wished to enter the army, which was his father's profession, but failing to obtain a commission he followed the advice of his father and matriculated in 1837 at Brasenose College, Oxford, with a view to enter the church. Immediately after his matriculation the commission was granted, but his father induced him, though reluctantly, to adhere to the profession he had adopted. On completing his university course he was ordained on 12th July, 1840. After a curacy of a year he took priest's orders. He then went abroad, and at Geneva married the daughter of Sir George William Denys. In 1842 he entered on his duties as curate to the incumbent of Christ Church, Cheltenham. After four years passed in this office he went abroad again. He visited the Tyrol and Germany, and endeavoured to acquaint himself with the views of German theologians. On his return he received the Church of St Ebbe's parish, Oxford, but soon left it to become incumbent of Trinity Chapel, Brighton, on which he entered on 15th August, 1847. He continued in this charge till his death on 15th August, 1853.

Robertson caused great excitement in Brighton by the freedom of his religious views, and made himself

popular by the energy with which he advocated and supported schemes of philanthropy generally, and especially such as aimed at the elevation of the labouring classes. His views on the Sabbath, the atonement, baptism, and inspiration were assailed as being wanting in orthodoxy, and he was accused of preaching democracy and socialism. He assisted in establishing a working man's institute, and frequently by public addresses expressed his interest in all that concerns the welfare of the masses. The energy with which he devoted himself to his profession is said to have shortened his days. Notwithstanding his renown as a preacher he expressed his own dislike of the function. Robertson's view of Christianity was certainly not a conventional one. The events in the life, death, and resurrection of Jesus, recorded in the Gospels, were matters of faith with him, but he took a philosophical view of dogmatic theology, which he held to be susceptible of cyclical development. Besides occasional addresses, his published works embrace *Lectures and Addresses on Literary and Social Topics* (8vo, London, 1858), *Analysis of Tennyson's In Memoriam* (1862), *Sermons* (1st and 2nd series 1855, 3rd series 1857, 4th series 1859, 5th series 1890), *Expository Lectures on the Epistles to the Corinthians* (1859). His *Literary Remains*, published posthumously in 1876, include some of the above mentioned works. See *Life and Letters of F. W. Robertson*, by Stopford A. Brooke (two vols 8vo, 1865).

ROBERTSON, JOSEPH, LL.D., Scottish antiquary, was born at Aberdeen in 1810. He was educated at the school of Uddry, at Aberdeen Grammar School, and Marischal College, Aberdeen. At the former school he was chiefly distinguished for feats of daring, but at the university he worked hard, and became a proficient in Latin. On leaving the university he was apprenticed to a writer in Aberdeen, but soon began to show his literary tastes by contributing to the *Aberdeen Magazine*. In 1833 he went to Edinburgh, to which he appears to have been drawn by his taste for antiquarian lore. In 1835 he published a humorous *Guide to Dunsie*, under the pseudonym of John Brown, a car driver of the district. He also wrote for the *Edinburgh Cabinet Cyclopaedia* a volume on the *Circumnavigation of the Globe*, published in 1836. In 1839 appeared the *Book of Bon Accord*, an archaeological and historical guide to Aberdeen, and a volume of selections from little known authors, under the title of *Delicæ Literariæ*. In 1839 he returned to Aberdeen, and became editor of the *Aberdeen Constitutional and Conservative newspaper*. Here he assisted in founding the Spalding Club, to which he became editor. His own contributions consisted largely of a series of volumes of *Histories and Antiquities of the Counties of Aberdeen and Banff*, issued successively in 1843, 1847, 1857, and 1862. He also edited, in conjunction with Dr Grubb of Aberdeen, the first publication of the club, *Gordon of Rothiemay's History of Scottish Affairs* from 1637 to 1641 (three vols., 1841), and at a later period he edited the *Diary of General Patrick Gordon*, published in 1859. In 1843 he accepted the editorship of the *Glasgow Constitutional*, and during his residence in the western capital he edited several volumes of local antiquities for the *Matland Club*. In 1849 he was appointed editor of the *Edinburgh Evening Courant*, a thrice weekly Conservative paper. In 1853 he received from government the more congenial appointment of superintendent of searches, now known as curator of the historical department of the Register House. Although the salary at first was only £200 a year he resigned for this appointment the more lucrative post of editor of the *Courant*. His salary was afterwards raised to £300, and during his

last year of office to £600. The first-fruit of his new labours was an Inventory of Queen Mary's Jewels and Furniture, which he contributed in 1863, with a valuable historical dissertation, to the publications of the Bannatyne Club. He also projected, with the sanction of the Lord Clerk Register of Scotland, a series of official publications on the early history of Scotland, the publication of which was begun subsequently to his death. He was likewise a contributor to the Quarterly Review, the British Archaeological Journal, and Chambers' Encyclopædia. His last work was the *Concilia Ecclesiæ Scoticanæ*, published in two vols in 1866 by the Bannatyne Club. This comprehensive work contains the statutes of all the Scottish ecclesiastical councils from the earliest records to the period of the Reformation. It is prefaced by a history of the councils, occupying the greater part of the first volume. Robertson died on 13th December, 1866. The University of Edinburgh conferred on him the degree of LL.D. in 1864. In addition to his own historical labours his assistance was freely given to all inquirers on historical antiquities.

ROBERTSON WILLIAM, the celebrated historian, was born at Northwick, in Midlothian, where his father was minister, in 1721. In 1733 his father removed to Edinburgh as minister of Lady Yester's Chapel in that city. After the completion of his course in the theological class of Edinburgh Robertson obtained a license to preach in 1741, and in 1743 was presented to the living of Gladsmuir, in East Lothian. He soon began to be distinguished by his eloquence and good taste as a preacher, and became known as a powerful speaker in the General Assembly of the Church of Scotland, in which he obtained an ascendancy by his eloquence and great talents for public business, which, exerted in favour of Conservative principles, gave him for a long time the lead in the ecclesiastical politics of Scotland. His *History of Scotland during the Reigns of Queen Mary and King James VI* appeared in 1759 (two vols 4to), and was received with general applause. In this praise no one more heartily concurred than Hume, between whom and Dr Robertson, notwithstanding religious and political differences, an intimate friendship was maintained through life. The distinction acquired by this work, which reached a fourth edition before his death, led to the author's nomination to be chaplain of Stirling Castle in 1759, one of the king's chaplains in 1761, and principal of the University of Edinburgh in 1762. Two years after he was made historiographer royal of Scotland, with a salary of £200 per annum. As head of a flourishing seat of education he was attentive to all his duties, and co-operated with the greatest liberality in all the improvements which have raised Edinburgh to its present celebrity. His *History of the Reign of Charles V* appeared in 1769 (three vols 4to), and his *History of America* in 1777 (two vols 4to). His latest work appeared in 1791, under the title of an Historical Dissertation concerning the Knowledge which the Ancients had of India, and the Progress of Trade with that Country prior to the Discovery of the Cape of Good Hope (4to). Dr Robertson died in 1793. As a historian he is admired for skilful and luminous arrangement, distinctness of narrative, and highly graphical description. His style is pure, dignified, and perspicuous. See the Account of his Life and Writings by Dugald Stewart.

ROBESPIERRE, MAXIMILIEN FRANÇOIS MARIE ISIDORE, was born at Arras in 1758, and was the eldest son of an advocate of the superior council of Artois. His father dying when he was young, he was indebted for his education to the Bishop of Arras, who gave him an exhibition in the College of

Louis le Grand, at Paris. He completed his youthful studies in a manner creditable to his talents and application, and at this period is said to have derived an attachment to republicanism from the lessons of one of his tutors, M. Hérivaux, who was an enthusiastic admirer of the heroes of ancient Greece and Rome. In 1775, when Louis XVI, after his accession to the crown, made his entry into Paris, Robespierre was deputed by his fellow students to present their homage to the new sovereign. Having adopted the law as a profession, he became an advocate of the council of Artois. Previously to the revolution he was advantageously known, both on account of his professional abilities, and the liberal and enlightened spirit which he exhibited in his conduct and writings. In 1789 he was elected a deputy from the *tiers état* of the province of Artois to the states general. In that assembly he advocated the liberty of the press, and other popular measures, but his eloquence did not attract much attention, and he attached himself, in the first instance, so closely to Mirabeau, that he acquired the epithet of *Le Sang de Mirabeau*. At this time, however, he frequented the Jacobin assemblies and the clubs of the lower orders, over whom he gained an ascendancy, of which he afterwards availed himself to make his way to despotic power. He took an active part in the proceedings of the constituent assembly, although he did not attract much notice at the time. On 14th July, 1789, he demanded the immediate arrest of all the suspected. In May, 1790, he espoused the cause of the brigands who were burning the châteaux of the nobility throughout France, declaring that the latter were the aggressors. On the 30th of this month he proposed the abolition of capital punishment. This has generally and justly been looked on as a startling inconsistency. Robespierre had probably in view at the time the old established authorities, whom the revolution was overturning, and whom he wished to deprive of all the power he could take from them. It did not then occur to him that the new authority he wished to establish might stand in need of the same weapons, although the violence of his own proposals in other respects might well have indicated to others what the result would be. On 23d June, 1791, he proposed that the king and queen should be tried by the common tribunals. The king, he urged, was a public functionary responsible to the nation, and the queen merely a private citizen. His popularity with the people was at the same time maintained by the usual means. The popular estimation of him was indicated by the epithet *L'Incorruptible*. At the tumultuary meeting in the Champ de Mars, July 17, an altar, with the inscription, 'À celui qui a bien mérité de la Patrie,' and below it the name of *Robespierre*, testified their admiration. The closing of the constituent assembly, September 30, afforded him another triumph, when the mob presented him with a garland of oak leaves, and taking the horses from his carriage, drew him through the streets, exclaiming, 'Behold the friend of the people, the great defender of liberty.' It does not appear that he actively interfered in the riot of August 10, 1792, or in the massacres which took place in the prisons of Paris, in the beginning of September, but he was connected with Marat and Danton, of whose crimes, and those of their associates, he had sufficient address to reap the fruits, and like other tyrants, at length made his instruments his victims. In the proceedings against Louis XVI the proposer of the abolition of capital punishment distinguished himself for the relentless rancour with which he opposed every proposal calculated to avert or delay the fatal result. After the execution of the king, in promoting which the Girondists co-operated with Robes-

pierre and the Jacobins, the former were sacrificed to the ascendancy of the latter. The Hebertists (see HEBERT), who had joined in this work of destruction, were the next victims to the jealousy of the dictator, who had no sooner sent them to the scaffold, with the assistance of Danton and his friends, than he adopted measures for the ruin of that popular demagogue, whom he dreaded as his most dangerous rival. (See FRANCE—History.) His next measure was to throw the imputation of atheism and irreligion on those whom he had destroyed, and to establish a species of religious worship. Barrère, by his direction, promulgated his new system of worship, and June 8, 1794, Robespierre in person celebrated what he termed 'the feast of the Supreme Being.' His power seemed now to be completely established, and the reign of terror was at its height, but his tyranny had alarmed many of those who had been most intimately connected with him, and a conspiracy was formed for his destruction. (See TERROR, REIGN OF.) At this critical juncture, far from acting with the decision which previously marked his conduct, he waited for the attack of his enemies, and secluded himself from the public for more than a month, during which period he is said to have been employed in preparing an elaborate defence of his conduct, to be delivered in the national convention, where he made his appearance for that purpose July 26th (8th Thermidor), 1794. He was indirectly attacked by Boudon de l'Oise, after which Vadier, Cambon, Billaud Varennes, and several other members, spoke against him. He now perceived the extent of his danger, and the ensuing night was passed in consultation with St. Just, and others of his most intimate partisans, but their deliberations led to no decisive results. The next day, when they appeared in the convention, Tallien and Billaud openly accused Robespierre of despotism. A tumult ensued, and amidst cries of 'A bas le tyran' he in vain endeavoured to obtain a hearing. At length a decree of arrest was carried against him, and his brother, and his friends St. Just, Couthon, and Le Bas, were included in it. Robespierre was sent to the Luxembourg prison, but in the night he was set free by the keeper, and was conducted to the hall of the Commune of Paris, where Henriot, commander of the national guard, Fleuriot, the mayor of Paris, and others of his creatures, had assembled forces for his defence. This was the critical moment, but neither Henriot, nor Robespierre himself, had spirit sufficient to head the mob and lead it against the convention. While they deliberated their opponents proceeded to action. Barras and others having been appointed commissioners to direct the armed force of the metropolis, they, without difficulty, secured the persons of the fallen tyrant and his associates, who were all guillotined the next day, July 28, 1794. Robespierre endeavoured in vain to escape a public execution, by shooting himself with a pistol at the moment of his seizure, but he only fractured his lower jaw, and thus subjected himself to protracted suffering, which excited no compassion.

Of the wretches who disgraced the revolution, Robespierre was the most notorious, but not the most infamous. He did not court the drags of the people, like Marat, he amassed no money. He was politically insane, and was not, moreover, the author of all the enormities with which he has been charged. Among his colleagues of the committees, and especially those who were sent into the departments, many exercised cruelties which far exceeded their instructions. Those who contributed most to his overthrow, and were loudest in their accusations against him, had profited by his crimes, in which they were

deeply involved, and, like the scape-goat of the Jews, he was charged with the sins of the whole nation, or rather of the Jacobin government. On the whole, it is reasonable to conclude that something like principle and genuine enthusiasm guided this unhappy man in the first instance, but, wholly unable to govern the elements of wild disorder afloat around him, the characteristic cruelty of perplexed cowardice at length became his only instrument, either of action or self defence. Extreme theoretical opinions, personal ambition, profound ignorance of the higher springs of human conduct and of the art of governing men, unscrupulousness as to means, and a low instinct of influencing the unthinking masses by their passions, combined with a mistaken patriotism in producing the disastrous results of a career which, however extenuated, was one of the bloodiest and most revolting on record.

Robespierre has left some literary remains, comprising academical and political discourses, which have been published under the title of *Œuvres Choisies* (four vols 8vo, 1832). The most complete Life is that by Ernest Hamel (1865-67, three vols., also 1878, three vols.). See also Gallier's Robespierre, ses Principes, son Système Politique (1896).

ROBIN (*Erythacus*), the type genus of a family of birds included in the section Dendrocygnae, order Insectivores. The bill in these birds is short, slender, tapering, of conical shape, depressed at the base, with the ridge of the upper mandible almost straight. The tip is slightly decurved, and but imperfectly notched. The gape is provided with bristles. The nostrils are of oblong form, situated in the front of a membranous groove, which is feathered at its base. The tarsi are long and slender, and are protected in front by a single plate, often marked by divisions. The toes are of moderate size, the hind claws and toe being the largest, the toes themselves being covered by scutella or plates. The claws or nails are usually acute, curved, and compressed. These birds inhabit the eastern hemisphere chiefly, and are distributed almost equally throughout the continents therein included. The dietary consists chiefly of insects, worms, and like fare, and these birds are very active in searching for food on the ground. They feed on fruits and seeds also, and especially in the winter season. The nests are generally of large size, and are lined with soft materials, such as down, moss, feathers, &c. The eggs are generally pale blue. The Robin Redbreast is *E. rubecula*. The genus *Saxicola* (wheat ear, whin chat, stone chat) connects the robins with the thrushes.

ROBIN GOODFELLOW. See PUCK.

ROBIN HOOD. See HOOD (ROBIN).

ROBINIA. See LOCUST.

ROBINS, BENJAMIN, mathematician and artillery, was born at Bath in 1707. His parents, who were members of the Society of Friends, were too poor to give him a liberal education, but his natural aptitude for mathematics was so great that with a little occasional assistance he made himself master of the elements of the science, and became so great a proficient in it that, after consulting Dr Pemberton, a mathematician of eminence, he went to London, and with the view of pursuing his studies to greater advantage established himself as a teacher of mathematics. He went to London in the garb of a Quaker, but this peculiarity he afterwards abandoned. While pursuing his avocation he not only contrived to make himself acquainted with the ancient and modern masters of geometry, but to acquire a knowledge of the classical and modern languages. In 1727 he exhibited the first-fruits of his studies in a demonstration of the eleventh proposition in Newton's Treatise on Quadratures, contributed to the Philosophical Transactions. During the following

year he published a work entitled *The Present State of the Republic of Letters*, which at once gave its author a high position as an authority in the exact sciences, on account of the part he took in a controversy of importance which then excited the greatest interest. Leibnitz had propounded a law, at once physical and metaphysical, known as the law of continuity. In virtue of this law he held that there could be no bodies (such as atoms) without elasticity, because if two non elastic bodies met with equal and opposite velocities they would come to rest at once, and thus violate the law of continuity, which requires that they should pass through all the intermediate states between the previous state of motion and the state of repose before coming to rest. This theory was associated by Leibnitz with a particular law of motion which he believed he had demonstrated, that the forces of moving bodies are in proportion to the squares of their velocities. Descartes held that the forces are only in the ratio of the velocities. In a *Discourse on Motion* which appeared at this time Bernoulli adopted the views of Leibnitz. He was replied to at the same time by two mathematicians, MacLaurin and Robins, who both succeeded in demonstrating the truth of Descartes' law. Robins also contended against the law of continuity as being founded on theoretical maxims, and not on experiment. In 1735 he published a *Discourse concerning the Certainties of Sir I. Newton's Method of Fluxions*, in refutation of another metaphysical objection to a scientific demonstration. Berkeley, bishop of Cloyne, denied the theoretical accuracy of Newton's method in a work entitled the *Analyst*, published in 1735. His argument was based on a mis conception of the meaning of evanescent quantities, a subject not dealt with by ancient geometers, and which he supposed to be equivalent to zero. In 1738 he wrote a defence of Newton against another assailant on the subject of the sun's parallax, and in 1739 *Remarks on Euler's Treatise on Motion*, and several other scientific works of the period. During this time he had been occupied with a special subject of investigation, and his chief work, the *New Principles of Gunnery*, appeared in 1742. He proposed two methods of ascertaining the velocities of projectiles, one by calculation, the other by an instrument, the ballistic pendulum, which has been found more efficient and certain than calculation in actual use. After experiments made and replies to objections he received the gold medal of the Royal Society in 1747. Having commended himself to the government not only by his scientific abilities, but by taking an active part in political discussions, he was offered the choice of two appointments—to go to Paris as one of the commissioners to settle a dispute regarding the boundaries of Acadia, or to be engineer in general to the East India Company. He chose the latter, and sailed for Madras, where he arrived in July, 1750. While he was preparing plans for the improvement of the fortifications of that city he was seized with fever, of the after-consequences of which he died, 29th July, 1751. A large share in the *Narrative of Lord Anson's Voyage Round the World*, published in the name of the Rev. W. Walter, chaplain of one of the vessels of Lord Anson's squadron, has been attributed to Robins. It is certain the work was submitted to him for some purpose, but what his share in it was is unascertained. Two posthumous volumes of his mathematical works and experiments in gunnery were published in 1761 by Dr. Wilson. He also wrote a defence of Sir John Cope after the battle of Prestonpans.

ROBINSON, REV. EDWARD, D.D., LL.D., biblical scholar and philologist, was born at Southington,

Connecticut, U.S., in 1794. He graduated with highest honours at Hamilton College, Clinton, N.Y., in 1816, and held the post of tutor in mathematics in the same college till 1818. In 1821 he superintended at Andover the publication of a classical manual for college use. At this time he studied Hebrew, and at the request of the author corrected the early proofs of the second edition of Moses Stuart's *Hebrew Grammar*, and subsequently assisted in the preparation of the work. From 1823 to 1826 he acted as assistant to Professor Stuart in the chair of sacred literature in the Theological Seminary at Andover. In 1826 he visited Europe, and up till 1830 he occupied himself in studying chiefly at Halle. Here he married his second wife, the daughter of Professor Ludwig von Jakob. He also visited Berlin, Paris, and other seats of learning. From 1830 to 1833 he held an extraordinary chair of sacred literature at the Andover Seminary. From 1833 to 1837 he resided at Boston. In 1837 he received the chair of biblical literature in the Union Theological Seminary, New York, which he held till his death. Before entering on the duties of his office he made a visit to Palestine in company with Dr. M. Smith, and made a minute and careful survey of the country, the results of which were embodied in a narrative published simultaneously in England, Germany, and America, *Biblical Researches in Palestine and in the adjacent Countries, a Journal of Travels in the Year 1838* (London, Halle, and Boston, 1841). He entered on the duties of his professorship in 1840. In 1852 he made a second visit to Palestine in connection with Dr. Smith, published the results of his fresh investigations in one volume in 1856, at the same time revising his previous researches. Dr. Robinson was an active and efficient member of the American Geographical, Oriental, and Ethnological Societies. He received the degree of D.D. from Dartmouth College in 1831, and from the University of Halle in 1842, and that of LL.D. from Yale College in 1844. He died 27th January, 1863. Dr. Robinson edited the *Biblical Repository*, 1831-34, and subsequently contributed to this valuable serial, in which the results of German scholarship were presented in translations. He prepared or translated various educational works in classical and oriental literature, including Gesenius's *Lexicon*. He revised Calvert's *Dictionary for publication in America*. He published in 1836 a *Greek and English Lexicon of the New Testament*, which was republished with extensive alterations in 1850, and the *Harmony of the Four Gospels*, in Greek (1845) and in English (1846). In 1865 was published posthumously a *Physical Geography of the Holy Land*, as a supplement to the *Biblical Researches in Palestine*.

THERESA ALBERTINE LOUISE, the second wife of Dr. Robinson, born at Halle in 1797, was known before her marriage as an author under the name of Talvi. While residing at Kharkov with her father, who was professor at the university there, she began to study Slavonian, and wrote her first poems. Removing with her father to St. Petersburg she occupied herself with the study of modern languages and of history. In 1816, on returning to Halle, she began the study of Latin. In 1825 she published a few tales in a volume bearing the title *Psyche*. She had already, in 1822, published translations of *Old Mortality* and the *Black Dwarf*. She also published, in 1825-26, translations of a number of Servian popular songs under the title of *Volklieder der Serben*. She married Professor Robinson in 1828, and accompanied him to America in 1830. Here she began the study of the aboriginal languages, and translated into German Pickering's work on the Indian tongues. In 1834 she wrote a *Historical*

Review of the Slavic Languages for the Biblical Repository, which was republished in an enlarged form in 1850. During her husband's visit to Palestine she resided in Germany, where she published, in 1840, *Charakteristik der Volk-slieder germanischer Nationen mit einer Uebersicht der Lieder aus serueuropaischer Volkerschaften*. *Die Colonisation von Neuengland* was published at Leipzig in 1847, a defective translation by W. Hazlitt, jun., was published in London in 1851. She also wrote numerous tales, and contributed to magazines, both German and English. She died at Hamburg in 1869.

ROBINSON, HENRY CRABB, barrister and 'friend and associate of Goethe and Wordsworth, Wieland and Coleridge, Flaxman and Blake, Clarkson and Charles Lamb', was born at Bury St. Edmunds on May 15, 1775. During the five years 1790-95 he was articled clerk to an attorney at Colchester, and in 1796 he entered a solicitor's office in London. In 1800 he went to Germany where he spent five years in studying at Jena and elsewhere and in making the acquaintance of Goethe, Schiller, Wieland, Herder, Kotzebue, and other noted Germans. In 1807 he went to Altona as Times correspondent, and in 1808-9 he was war correspondent in Spain for the same newspaper. He was called to the bar in 1813, and practised with considerable success till his retreat in 1828. He frequently visited the Continent, where he gained the friendship of many distinguished persons other than those whom he had met in his student days. He died on Feb. 5, 1867, in his ninety-second year. Crabb Robinson was associated with the foundation of the University of London in 1828. He was a splendid conversationalist, but he never made any serious attempt to gain distinction as a writer. His intimate acquaintance with many of the greatest men and women of his time, both in Britain and on the Continent, gives peculiar interest and value to the selections from his *Diary, Reminiscences and Correspondence* which Dr. Sudler edited in three volumes in 1869.

ROBINSON CRUSOE. This celebrated fictitious narrative, written by the well-known Defoe, was published in 1719, under the title of *The Life and Strange Surprising Adventures of Robinson Crusoe, of York, Mariner, who lived eight and twenty Years all alone, &c. Written by Himself*. The favourable reception the work met with induced the author to pursue the subject, and a few months later appeared the *Further Adventures of Robinson Crusoe*, being the second and last Part of his Life, &c. It is almost needless to say that the work has since appeared under an almost endless variety of forms and in almost all languages and has been the delight of childhood no less than the amusement of those of mature years. 'Was there ever anything written by mere man', says Dr. Johnson, 'that was wished longer by its readers, excepting Don Quixote, Robinson Crusoe, and the Pilgrim's Progress?' 'There is one book', says Rousseau, 'which shall long form the whole library of Emile, and which shall preserve a high rank to the last: it is not Aristotle, nor Pliny, nor Buffon: it is Robinson Crusoe.' Its fine sentiments, its pure morality, its practical good sense, united with its simplicity, truth of description and lively delineations of the natural feelings, combine to give it the charm of fiction and the air and weight of reality. A so-called third part appeared under the title *Serious Reflections during the Life and surprising Adventures of Robinson Crusoe*, by himself (1720), but this never had any success, and, indeed, has little or no connection with the work to which it was professedly attached. The original work was im-

mediately translated into French, and soon after into other languages, and various imitations appeared, both English and foreign. Of the innumerable English editions many are mutilated or altered in various ways, so that the reader seldom gets the text as it came from the pen of the author himself. The story once current of Defoe's fraudulently using the papers of a Scotch mariner of the name of Selkirk in the composition of his book is known to be without foundation, though he took the hint, doubtless, from Selkirk's adventures. The real story of Selkirk is as follows:—He was a Scottish sailor who passed some years alone on the island of Juan Fernandez, and was a native of Largo in Fife-shire. In 1703 he sailed as master in the *Cinque Ports* privateer under Captain Stradling. In consequence of some difference with his commander he went ashore at Juan Fernandez, and remained in his solitude till he was taken away by Captain Woods Rogers in January 1709. Some account of his residence was published by Stodd in the *Englishman* (No. 26), and in Rogers' *Voyage round the World* (1712), but there is no reason to believe that he had any papers or journal of any sort. Crusoe's island, we may remark, was 'on the coast of America, near the mouth of the great river of Oroonoke'.—See *Howell's Life and Adventures of Alexander Selkirk* (Edinburgh 1829). See also *Defoe*.

ROBINSON DR. JOHN, a distinguished mechanical philosopher and professor, was born at Boghall, the seat of his father in the parish of Baldermoch and county of Stirling, in 1739. He was originally destined for the church, and after attending the grammar school of Glasgow, was entered a student of that university in 1750. In 1758 he accepted the office of private tutor to the son of Admiral Knowles, who, as a midshipman, was then about to accompany the expedition under General Wolfe for the reduction of Canada. In that situation, besides instructing his pupil in mathematics and navigation, he was employed in making surveys of the coasts and harbours on the river St. Lawrence, having been rated as a midshipman on board the *Royal William*, in which his pupil was soon made a lieutenant. In 1762 he was appointed by the board of longitude to accompany young Harrison, son of the celebrated horologist, to take charge of the time-keeper lately completed by the elder Harrison, in a voyage to the West Indies. In 1763 he returned to Glasgow, and renewed with ardour his academical studies, devoting himself more particularly to mechanical philosophy, to which he was influenced by his acquaintance with James Watt, then employed in perfecting the steam engine. In 1766 he was appointed to succeed Dr. Black in the chair of chemistry in the university. His friend Admiral Knowles having been recommended by the British government to the Empress Catharine of Russia to superintend the improvement of her navy, Robinson was induced to accompany him in the capacity of private secretary in 1770. After remaining in this situation for nearly two years, he was appointed by the empress inspector-general of the corps of marine cadets at Cronstadt, with the rank of lieutenant-colonel. In 1773 he accepted the chair of natural philosophy at Edinburgh, which he continued to fill with distinguished reputation till his death on Jan. 30, 1805. His writings include *Elements of Mechanical Philosophy* (1804), *A System of Mechanical Philosophy* (four vols., 1822), and many contributions to the third edition of the *Encyclopædia Britannica*.

ROB ROY (that is, *Robert the Red*), a celebrated Highland freebooter, whose true name was Robert Macgregor, but who assumed that of Campbell, on

account of the outlawry of the clan Macgregor by the Scotch Parliament in 1662. He was born about 1660. He was the younger son of Donald Macgregor of Glengyle, said to have been a lieutenant-colonel in the service of James II., by his wife, a daughter of Campbell of Glenfalloch. His own designation was of Inversnaid, but he seems to have acquired a right to the property of Craig Royston, a domain of rock and forest lying on the east side of Loch Lomond. Like other Highland gentlemen, Rob Roy was a trader in cattle previous to the rebellion of 1715, in which he joined the adherents of the Pretender (See STUART, JAMES EDWARD). On the suppression of the rebellion the Duke of Montrose, with whom Rob Roy had previously had a quarrel, took the opportunity to deprive him of his estates, and the latter began to indemnify himself by a war of reprisals upon the property of the duke. After a long and eventful career and many hair breadth escapes from his enemies, on Dec. 28, 1734, he died an aged man in his bed in his own house in the parish of Balquhdder. See Sir Walter Scott's Introduction to the novel of Rob Roy for a full account of this chieftain, whom the great novelist has plucked from the dim light of fast fading tradition and made immortal.

ROBURITE, an explosive patented by Dr. Roth in 1887. It consists of dinitrochlor benzene mixed with ammonium nitrate, and must be used dry. It does not explode by friction or shock, but can be detonated readily.

ROC, a fabulous bird of immense size and strength, which is mentioned in the Arabian Nights' Entertainments. The supposed existence of this bird seems to be due to eastern imagination. A belief in it was spread in Europe during the Middle Ages, having been brought from the East probably as a consequence of the Crusades. It was believed to be large enough to carry away an elephant in its talons.

ROCAMBOLE (*Allium scorodoprasum*, natural order Liliacæ), a species of onion, having bulbs resembling those of the garlic, but the cloves are smaller. It is cultivated for the same purposes, and is considered as having a more delicate flavour.

ROCHAMBEAU, JEAN BAPTISTE DONATIEU DE VIMUR, COMTE DE, French marshal, was born at Vendôme on July 1, 1725, and entered the army in 1742. He distinguished himself in the Minorca expedition of 1756, and in 1780 he went to North America as lieutenant general in command of 6000 men to support the Americans in their rebellion against Great Britain. He landed at Rhode Island, and in the following year he rendered valuable assistance to Washington in the Yorktown campaign. After the outbreak of the French Revolution he became commander of the army of the north, and in 1791 he received a marshal's baton. He narrowly escaped the guillotine during the Reign of Terror. In 1804 Napoleon created him a grand officer of the Legion of Honour. He died on May 10, 1807. His Memoires were published in 1809, and an English translation of them appeared in 1838.

ROCHDALE, a market town, municipal, county, and parliamentary borough of England, in Lancashire, 10 miles N.W. of Manchester, on both sides of the Roch, here crossed by five bridges, on the Rochdale Canal, the Calder and Hebble Navigation, and the Lancashire and Yorkshire Railway. It is irregularly built, and consists for the most part of narrow and inconvenient streets, but great improvements have recently been made. Several of the old streets, more especially the principal thoroughfares, have been widened out, and various modern streets present a handsome appearance. Most of the houses are built of brick, but a few of the best are built of stone obtained from quarries in the vicinity, the

usual covering of the roofs is stone, not slate. The parish church of St. Chad, finely situated on a lofty height, and approached from the lower part of the town by a flight of 122 steps, is a spacious and venerable structure of the twelfth century (restored in 1837), partly in the late Norman and partly in the Perpendicular style, with a square unbattled tower, several windows of rich tracery, and some very ancient monuments. The other important buildings and establishments are the town hall, a magnificent building (the spire and tower of which have been rebuilt since their destruction by fire in 1883), with surrounding grounds laid out by the corporation for recreation, a handsome free library to hold 40,000 volumes, a large public hall used for concerts, the grammar school, founded in 1565 by Archbishop Parker, the technical school, a recent building in Gothic style, public baths, an infirmary, and a hospital for infectious diseases. The staple manufactures are woollen goods, chiefly hosiery, flannels, blankets, kerseys, and cotton goods, chiefly calicoes. There are also various cotton mills, at which warps and yarn are spun, several foundries, machine shops, &c. In the vicinity are freestone quarries and extensive collieries. Rochdale is a place of considerable antiquity, and had a Roman station in its vicinity. Its woollen manufacture appears to have been introduced by the Flemings in the reign of Edward III., and having continued to flourish, is mentioned as famous in the reign of Elizabeth. The Rochdale Co-operative Store, which has about twelve branches in the town, was the first society of its kind, and has served as a model for other co-operative societies (See CO-OPERATIVE SOCIETIES). Rochdale was first constituted a borough by the Reform Act of 1832, and sends a member to the House of Commons. Pop. in 1881, 68,866, in 1891, 71,401, in 1901, 60,600, 83,112, par. bor. 76,122.

ROCHEFORT, or **ROCHEFORT SUR MER**, a town of France, in the department of Charente Inférieure, capital of an arrondissement and of the fourth maritime prefecture and a fortress of the second class, situated partly on a reclaimed marsh and partly on the slope of a small hill on the right bank of the Charente, 12 miles from its mouth, on the railway from Nantes to Bordeaux. The commercial port consists partly of the deepened river channel and partly of three wet basins communicating with the river, and in connection with it there is a graving-dock. The naval port, situated farther down the river, has a yard for building men-of-war, and has three graving docks, one of which can admit the largest vessels. Beside it is an arsenal provided with all the latest appliances for the equipment of war vessels. The chief square of the town is the Place Colbert, and the most striking building is the naval hospital, outside the ramparts. Other buildings and institutions are the marine prefecture, barracks, lyceum and other schools, a communal and other libraries, several museums, a prison, naval observatory, &c. The manufactures include tiles, drainage pipes, lime, beer, spirits, candles, ice, vinegar, artificial flowers, and naval clothing, and there are also iron, copper, and zinc foundries, saw-mills, &c. Rochefort is first mentioned in the eleventh century, and was made a naval port by Colbert in the seventeenth century. Pop. of commune (1896), 34,392, (1901), 35,528.

ROCHEFOUCAULD, FRANÇOIS, DUC DE LA. See LA ROCHEFOUCAULD.

ROCHEJAQUELEIN, HENRI DE LA. See LA ROCHEJAQUELEIN.

ROCHELLE, LA, a town and seaport of France, capital of the department of Charente Inférieure, advantageously situated on the Atlantic, at the

bottom of a bay which serves it for roadstead, and in front of which are the isles of Rhe and Oleron, 95 miles north by west of Bordeaux. It is walled and otherwise fortified, so as to be a place of considerable strength, and is generally well built. Many of the houses have porticoes. The finest streets are those of Dauphine, Puits Doux, Chaudellerie, Palais, and Grosse Horloge, which, following each other in succession, traverse the town from north to south and form a splendid avenue. The principal square, called Place du Château, is both large and handsome. The objects most deserving of notice are the Porte de l'Horloge, a fine Gothic structure adorned with trophies and surmounted by a spire, the Hôtel de Ville, of no great architectural merit, but of some historical interest, the cathedral, exchange, public library, Palais de Justice, baths, and arsenal. The manufactures are of some importance, as are also the fisheries (including sardines, &c.) The harbour admits vessels of 500 tons or more, and is commodious and safe. Recently a new port has been formed at La Pallice, which is furnished with dry docks and is becoming frequented by large vessels, being easily accessible at all states of the tide. The trade carried on here is of importance, and is chiefly in brandy, wine, wood, iron, coal, salt, colonial produce, cheese, butter, and oil. La Rochelle is the see of a bishop and the seat of a court of first resort and commerce, among its educational institutions are a communal college, a school of navigation, and an academy of belles lettres, science, and art. Though a place of considerable antiquity, its history does not possess much interest till the period of the Reformation, when it repeatedly distinguished itself in the cause of Protestantism, and stood two memorable sieges—one in 1572, when its valiant defence was successful in resisting nine grand and more than twenty minor assaults, and the other in 1627–28, when, after fourteen months, famine forced it to surrender. Its fortifications were then destroyed, but were afterwards rebuilt in an improved form by Vauban. Pop (1901), 31,318.

ROCHELLE SALTS, double tartrate of sodium and potassium, which crystallizes in large colourless and transparent rhombic prisms, so named because discovered by an apothecary of Rochelle. It is a common aperient medicine. See **TARTARIC ACID**.

ROCHESTER, a city, parliamentary borough, and river port of England, in the county of Kent, 29 miles south east of London, on the Medway, adjoining Chatham. It consists of Rochester proper, on the right bank of the river, and the parishes of Strood Intra and Frindsbury on the left, communication being kept up by a bridge. Rochester proper, which is joined by Chatham on the east, occupies an angle formed by the Medway, which, bending round first in a north east and then suddenly in a south-east direction, incloses it on three sides. When approached from the bridge the broad expanse of the river, its ancient castle crowning an abrupt eminence, and the works connected with the Chatham lines of fortification, give it a very striking appearance. It consists principally of one spacious street, which, commencing at the bridge, traverses it in a s.e. direction towards Chatham, and of a number of minor streets, and though by no means regularly built, contains a great number of respectable houses of stone, interspersed with several of brick or timber. The objects of most interest are the cathedral, founded in 604, but completed at various periods, and presenting a mixture of styles, among which the enriched Norman of its west front is very beautiful, while the spacious crypt forms an excellent specimen of the Early English style, the remains of the castle (now owned by the

corporation), inclosing a quadrangular area nearly 300 feet square, but consisting chiefly of the great tower, which is in the form of a square, and is considered one of the most perfect specimens of Norman military architecture extant, Eastgate House, an old Elizabethan mansion acquired by the corporation to be used as a museum of local antiquities, the royal free grammar school, forming part of the establishment of the cathedral, and other endowed schools, the guild hall, a handsome brick building, with a Doric colonnade of duplicated pillars, the clock house, the theatre, assembly rooms, &c. The industries embrace ship building, the making of agricultural implements, traction-engines, oil cake, &c. Some shipping is carried on. Considerable quantities of oysters are obtained from a productive oyster fishery belonging to the corporation. Many of the inhabitants are employed in the adjoining naval and military establishments. The borough used to send two members to Parliament, but lost one of them in 1885. Pop in 1881, 21,307, in 1891, 26,290, in 1901, 30,622.

ROCHESTER, a city of the United States, capital of Monroe county, New York, on both sides of the Genesee, 7 miles above its mouth in Lake Ontario, on the Erie Canal, which here crosses the river by a splendid aqueduct, and on the New York Central Railway. The town on both sides of the river, though not very regular, is well built. The communication between the opposite banks is kept up by six bridges, one of these forms the continuation of Main Street, which is both straight and spacious, and divides the town transversely into two parts by running nearly through its centre. The chief public buildings and institutions are a cathedral, about 70 churches some of them elegant structures, a court house and city hall, a university, a Baptist theological seminary, a free library, an athenaeum, St Mary's Hospital, an immense building, with accommodation for 1000 patients, a city hospital, lunatic asylum, the State house of refuge, two orphan asylums, &c. The rise and progress of Rochester have been very rapid, and are owing partly to its central situation giving it the command of a most important transit trade, and still more to the immense water power furnished by the three falls of the Genesee, which here makes a descent of 268 feet by a series of rapids and cascades. One of these, the Great Cataract, has a height of 96 feet. The power furnished by the falls is partly used in supplying electricity, and is also employed in driving the machinery of flour mills, which are here on a scale of almost unrivalled magnitude. It is also used in saw, paper, and cotton mills, and in other manufacturing establishments, as woollen factories, distilleries, breweries, &c. There is here a very large shoe making and ready made clothing trade. The suburbs are highly cultivated, there being 4000 acres of fruit trees and nurseries of 250 to 500 acres. The nursery trade is unrivalled by any locality in the world. In 1812 two log huts were the only buildings on the site of Rochester. Pop (1880), 89,366, (1890), 133,896, (1900), 162,608.

ROCHESTER, JOHN WILMOT, EARL OF, a witty and profligate nobleman of the court of Charles II., was born at Ditchley (Oxfordshire) on April 10, 1647, and on his father's death in 1658 succeeded him in his titles and estates, the latter of which he soon dissipated. Having gone through the usual course of study at Oxford, he made a tour through France and Italy, and then served in the fleet under Lord Sandwich, distinguishing himself by his bravery at the attack on Bergen. On his return to England he rushed into the full vortex of dissipation, and became the personal friend and favourite of his

sovereign, who is said to have encouraged and shared many of his exploits. The levity of his disposition frequently brought him into disgrace, and he was more than once forbidden the royal presence, his companionable qualities, however, which made him necessary to the amusement of his master, prevented his occasional exile from being ever of long continuance. His associates in dissipation included George Villiers, second duke of Buckingham, Charles Sackville, duke of Dorset, Sir Charles Sedley, and Henry Savile. He afterwards asserted that he was under the influence of drink for five consecutive years. His constitution at length gave way under such excesses, and at the age of thirty he was visited with all the debility of old age. He lingered for some time in this condition, and died, after sending for Bishop Burnet and professing great penitence for his dissipated life, July 26, 1680. He had partly repaired his fortune by a marriage with a wealthy lady in 1667. His poetical works some of which are of the most disgusting description have been frequently printed. A few of his poems are of a better stamp, especially his poem on Nothing and his lampoon upon Sir Clair Scroope, which exhibit some vigour, with careless versification. His Satire against Mankind is little more than a translation from Boileau. Several selections from his correspondence have been published. See *Some Passages of the Life and Death of John Earl of Rochester*, by Bishop Burnet, and Johnson's *Lives of the Poets*. **ROCHE SUR YON**, LA, the name now given to Bourbon Vendee (which see).

ROCHET, a lawn or lace garment somewhat like the surplice in shape, but with close fitting sleeves, worn by bishops, abbots, priates, canons of certain privileged chapters, and other ecclesiastical dignitaries.

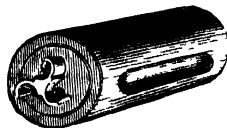
ROCHETTE Désiré RAOUX, often called *Raoul Rochette*, a French archaeologist, was born 9th March, 1790, at Saint Amand in the department of Cher. He was educated at Bourges, went to Paris in 1811, and was appointed professor of history at the Lycée Impérial. In 1813 he received a prize from the Academy of Inscriptions for his *Histoire critique des Colonnes Grecques*. Two years later he became assistant professor to Guizot, who filled the chair of modern history in the faculty of letters. His strong royalist opinions, his courtier like manners, his great popularity and reputation for learning, paved the way for his rapid advancement at the restoration. In 1818 he was named keeper of medals and the antiquities at the Bibliothèque, in 1820 royal censor, an office abolished in 1824, in 1826 he held the second chair of archaeology, and in two years succeeded Quatremère de Quincy in the higher chair. The lectures on Ancient Art, published in Paris in 1828, were translated into English by H. M. Westropp, and published in 1854. His *Antiquités du Bosphore Cimmérien* (1822) his edition of Brumoy's *Théâtre des Grecs* (sixteen vols., 1820-25), his translation of the *Fragmenta of Menander* and *Philemon* (1824), and various other works, gave the critics of France and Germany some reason to doubt the soundness of his scholarship. Part of the years 1826-27 he spent on a mission to Italy, and he published the results of his investigations in his *Monuments mémoires d'Antiquité*, &c. In 1838 he was elected perpetual secretary of the Academy of Fine Arts. He died in Paris, 3rd July, 1854. Among his other works not already mentioned the most important are *Tableau des Catacombes de Rome* (1837), *Lettres archéologiques sur la Peinture des Grecs* (1840), *Mémoire sur l'Acropole d'Athènes* (1845), and part of what was intended to be an extensive work, *Mémoires d'Archéologie comparée*,

Asiatique, Grecque, et Étrusque (1848). He intended to remodel much of what he had written into a history of ancient art, but did not live to accomplish his purpose.

ROCK CRYSTAL See **QUARTZ**.

ROCKET (*Brassica eruca*), a cruciferous plant growing wild in many parts of Europe. It has a strong, disagreeable odour, an acrid and pungent taste, but is much esteemed by some, and especially by the Italians, who use it in their salads. Its medicinal properties are antiscorbutic and stimulant. The stem is about 1½ foot high, rough, with soft hairs, and bearing long pinnated leaves, the flowers are whitish or pale yellow, with violet veins. The term rocket is also applied to the different species of *Hesperis*—cruciferous plants with purple flowers, often cultivated for ornament in gardens.

ROCKET, a projectile consisting of an iron cylinder filled with an inflammable composition, the reaction of the gases produced by the combustion of which, pressing on the head of the rocket, serve to propel it through the air. In order to develop sufficient gas to give it high velocity, a large conical cavity is drilled in the posterior end of the composition, by which means a much larger surface is exposed to the flame and a greatly increased volume of gas generated. Rockets were first used in eastern countries. The Chinese are said to have invented them. Tippoo Sahib used them against the English. Sir W. Congreve first made them of iron, and introduced them into the British service under the name of Congreve rockets. He employed shell heads, and heads filled with inflammable composition (termed carcass composition), for incendiary purposes. All these rockets were kept point first by the use of a stick, which acted on the principle of an arrow's feather. The recommendation of a rocket for war purposes is that, carrying in itself the means of its projection, it requires no gun to fire it, and it can be used from places and in ways where the employment of guns would be impossible. Sir W. Congreve spoke of it as 'the soul of artillery without the body'. The rocket now used in the British service has no stick, being kept point first by rapid rotation, imparted to it by means of three curved shields fixed on the base



so as to be on the same side of each vent, the invention of Mr Hale (See the accompanying figure.) The necessity for a stick is thus dispensed with. Rockets may be discharged from

tubes or troughs, or even laid on the ground. They may be ignited by a friction tube or a port fire. In flight they turn up the wind if fired with a stick. Hale's rockets have their range more affected than their direction by wind.

In war, rockets are chiefly used for incendiary purposes for moral effect—especially frightening horses—and for various irregular operations. The 24 and 9 inch patterns are those now in the British service.

Life saving rockets, as they are termed, are rockets made and designed for carrying a line over a wreck, and thus establishing a communication from ship to shore, by means of which a heavier line, and eventually a hawser, may be passed across and made fast to the ship's mast, when the crew may be hauled, singly or two together to shore in a sling or 'breeches-buoy'. See **LIFE ROCKETS**.

Signal or sky rockets are small rockets formed of pasteboard cylinders, filled with nearly the same composition as that used in Congreve rockets, but the head, terminating in a cone, contains, instead of a shell, a number of 'stars' of various ingredients.

and colour. The interstices between these are stuffed with powder, which, when the rocket has attained its greatest height, bursts the cylinder, causing the ignited stars to spread through the air, and cast a brilliant or coloured light which may be seen at a great distance.

ROCK-FISH, or **BLACK GOBY** (*Gobius niger*), a Teleostean fish belonging to the family Gobiidae or Gobiæ. (See GOBY.) The Rock fish, like other members of the Goby genus, possesses the ventral fins united to form a kind of suckorial disc by which it can attach itself to fixed objects. This fish is found on rocky coasts chiefly and inhabits the deeper rock pools left after the receding tide. The body is generally covered by an abundant mucous secretion, beneath which the small scales covering the body are almost concealed. The tail is not forked in the Rock fish, and appears heavy relatively to the size of the body. The first dorsal has its anterior and middle spines higher than the others, and is a smaller fin than the second dorsal. The teeth in this form are numerous, and of conical shape. Some of the Wrasse genus, belonging to the family Labridæ, are also occasionally known by the name of 'rock fishes.'

ROCKFORD, a city of the United States, capital of Winnebago county, Illinois, is finely situated on both sides of the Rock River, 93 miles W N W of Chicago, with which it is connected by rail. It is the centre of an active business, and has abundant water power. There are woollen and cotton factories and several iron-foundries, agricultural machine and implement factories, wagon and carriage factories. Pop. (1880), 13,129, (1890), 23,584.

ROCKHAMPTON, a town of Australia, Queensland, capital of the county of Livingstone, on the Fitzroy River, about 35 miles from its mouth, and 420 miles north west of Brisbane. It is the port of shipment for a large extent of back country, and also for some of the produce of the Peak Downs copper and gold mines. There are meat preserving works, soap factories, tanneries, &c. The town is surrounded with land of good quality, especially suitable for grazing purposes. Minerals are widely diffused, gold, copper, and silver deposits being worked within a radius of 40 miles of the town. Pop. (1901), 15,461.

ROCKING-STONES, or **LOGAN STONES**, are masses of rock, often of great size and weight, so nicely poised on lower masses that they can be moved backwards and forwards with but little force. Some of them are evidently artificial, others natural. The former appear to have been formed by cutting out a mass of rock round the centre point of the base of the block. The latter are generally granitic rocks, in which porphyry and felspar are abundantly found. These ingredients being rapidly decomposed, and the sand and dust swept away by wind and rain, what was originally a solid rock becomes a group of pillars of irregular shape, separated by horizontal and vertical fissures. Gradually the edges of the blocks forming the pillar decay, and it assumes the appearance of two or more spheroidal rocks, one resting on the other. When the upper masses are so situated as to pre-serve their equilibrium notwithstanding the gradual wearing away of their bases, rocking stones are the result. In England rocking stones are found in Cornwall, Yorkshire, Derbyshire, Lancashire, and Wales, in Scotland, in the shires of Perth and Kirkcudbright. They are supposed to have been employed in ancient times for purposes of divination, the favourable or unfavourable answer being determined by the number of vibrations.

ROCK ISLAND, a city of the United States, capital of the county of the same name, in the state of Illinois, on the Mississippi, 2 or 3 miles above the mouth of Rock River, at the foot of the Upper

Rapids, 182 miles west by south of Chicago. It derives its name from an island, 3 miles in length, the southern extremity of which is opposite the town, and on which there is a government arsenal. The city is a great centre of railway and river traffic, and is connected with the island and with Davenport on the other side of the river by a railway and general traffic bridge. Pop. (1880), 11,659, (1890) 13,634.

ROCKLAND, a city and seaport of the United States, capital of Knox county, Maine on the south-west side of Penobscot Bay, about 10 miles south east of Augusta. The inhabitants are chiefly engaged in ship building, and in the manufacture of lime from the immense limestone quarries in the vicinity. Iron-founding is also carried on to some extent. Pop. (1880), 7599, (1890), 8174.

ROCKLAND LAKE, a fine sheet of water in Rockland county, in the state of New York, about 30 miles north of the city of that name. It is about 4 or 5 miles in circumference, its waters are very pure, and it furnishes large supplies of ice to New York city.

ROCK LING (*Motella vulgaris*) a genus of Teleostean fishes included in the Gadidae or Cod family. The flesh is much esteemed, and of savoury nature.

ROCK RIVER rises in the state of Wisconsin, 50 miles west of Lake Michigan, it flows S S W, receives several tributaries, enters Illinois, and falls into the Mississippi a little below Rock Island city. Its whole length is estimated at 330 miles, about 225 of which have been ascended, though with some difficulty, owing to the various rapids, by small steam boats. The region which it drains is one of the most fertile in the world.

ROCKS See GEOLOGY.

ROCK SALT, native chloride of sodium. See SALT and SODIUM.

ROCK SCORPION (*Buthus* or *Scorpio afer*), a species of scorpion (which see) found in Africa, averaging about 6 inches in length. The comb like appendages borne on the lower surface of the body contain thirteen teeth. The bite of this form, although not absolutely fatal, is yet considered to be dangerous.

ROCK SNAKE, or **NATAL PYTHON** (*Hortulia Natalensis*), a genus of Colubrine Snakes belonging to the family Boidæ, and distinguished as a genus by the head being provided with irregularly shaped scales, by the presence of pits on the lip, and by the two rows of plates beneath the tail. The rock snake may attain a length of over 25 feet. The teeth are of large size, and exist in both jaws, but, as in all the Boidæ, no poison apparatus exists. The colour is a deep olive, marked by cross bands and spots of yellow margined with black. There is an arrow-shaped mark on the head, and a streak of dark colour passes from the hinder part of each eye. The belly and sides of the face are of a yellow colour. This snake is confined to Africa, and, like the boas, conceals itself in some situation coiled round some fixed object, whence it can readily and surely fasten on its prey, which it crushes among its muscular folds.

ROCK WORK, or **ROCKING**, in masonry, as its name implies, is that mode in which the stone has an artificial roughness given to it to imitate the natural face of a rock. It is thus performed. Rough draughts are cut round the face of the stone, from which the beds and joints are squared up. The workman then, with a pitching tool and mallet, or with a hammer similar to a ridding hammer, breaks or splits away pieces from the face and arrises of the stone, striving to avoid the appearance of formality, and taking care not to leave tool marks. It is an especial object, in taking out the pieces from the edges, that those in the two contiguous stones shall correspond as nearly as may be in size and depth, so

that the whole surface of the wall, when completed, may look as inartificial as possible. It is only in dressing such stones as admit of a piece being struck out of their face by a blow, without leaving a hammer mark, that rock work is admissible. Rock work formed by the chisel and mallet is insipid in the extreme, and its use evinces bad taste, as well as a lack of judgment.

ROCKY MOUNTAINS, a name indefinitely given to the whole of the extensive system of mountains which covers a great portion of the western half of North America, but more properly applied to the eastern border of this mountain region, commencing in New Mexico in about 32° 30' N lat., and extending throughout the continent to the Polar Sea, terminating west of the Mackenzie River, in lat. 69° N, lon 135° W. The Rocky Mountains in the United States are divided into two parts in Southern Wyoming by a tract of elevated plateaus. The chief groups of the southern half are the Front or Colorado Range, which in Wyoming has a mean elevation of 9000 feet (at Evan's Pass, where it is crossed by the Union Pacific Railway, 8269 feet). In Colorado it increases to a mean height of 13,000 feet, its highest points being Gray's Peak (14,341 feet), Long's Peak (14,271 feet), and Pike's Peak (14,147 feet). The Sawatch Range, south of the Arkansas River, has its highest peak in Mount Harvard (14,375 feet), with passes at an elevation of from 12,000 to 13,000 feet. The 'Parks' of Colorado are high mountain valleys, known as North, Middle, South, and San Luis parks, with an elevation of from 6000 to 10,000 feet, surrounded by ranges 3000 to 4000 feet higher. The west border of the San Luis Park is formed by the San Juan Range with at least a dozen peaks over 14,000 feet, and between one and two hundred above 13,000 feet. On the north eastern side this park is bounded by the Sangre de Cristo Range, in which is Blanca Peak (14,464 feet). The Uintah Range, directly west of North Park, has several points above 13,000 feet, and the Wahsatch Range, which forms the western limit of the southern division of the Rocky Mountains, rises to a height of 12,000 feet just east of Salt Lake City. The northern division of the Rocky Mountains, with the exception of the Wind River Range and the Yellowstone region (see **YELLOWSTONE**), is lower and has less impressive scenery than the southern. In Idaho and Montana the groups are more irregular in outline than in the south, and the division into ranges more uncertain. Of these the Bitter Root Mountains in part of their course form the divide between the Missouri and the Columbia. There two ranges reach altitudes of upwards of 9000 feet, and are crossed by a number of passes at elevations of from 5500 to 6500 feet. The Northern Pacific Railway crosses at Mullan's Pass (5548 feet) through a tunnel 3850 feet long. The Crazy Mountains, north of the Yellowstone, reach a height of 11,000 feet, other groups are the Big Horn Mountains and the Black Hills, whose highest point is Mount Harvey (9700 feet). In Canada the highest known peaks are Mount Brown (16,000 feet) and Mount Hooker (15,650 feet), lying about 53° N lat., the general altitude of this part of the range varying from 10,000 to 14,000 feet. The pass leading between Mount Brown and Mount Hooker, called the Athabasca Portage, has a height of 7300 feet. The Rocky Mountains contain some of the finest scenery in the world, and are specially rich in deposits of gold, silver, iron, copper, &c., which are worked extensively. They are in general scantily provided with vegetation, but occasionally magnificent forests occur. The river systems connected with the Rocky Mountains send their waters in very different directions. In the north the Mac-

kenzie flows to the Arctic Ocean, while the Saskatchewan and many other streams flow east to Hudson's Bay, the Atlantic receives large supplies through the St. Lawrence and the North American lakes, and also through the Mississippi, to the Pacific the only important tributaries from the Rocky Mountains are the Columbia and Colorado.

ROCOCO, a debased variety of the Louis-Quinze style of ornament, proceeding from it through the degeneracy of the Louis Quinze. It is generally a meaningless assemblage of scrolls and crimped conventional shell-work, wrought into all sorts of irregular and indescribable forms, without individuality and without expression.

ROCROI, or **ROCROY**, a village of France, department of Ardennes, 15 miles north west of Mézières, where the Duke d'Enghien (the great Condé) defeated the Spaniards, May 19, 1643.

ROD, a measure of length equal to 16½ feet. A square rod is the usual measure of brick-work, and is equal to 272½ square feet.

RODENTIA, or **GLIRES**, an extensive order of Mammalia, represented by such forms as Rats and Mice, Beavers, Porcupines, Squirrels, Dormice, Jerboas, Rabbits, Hares, Lemmings, &c (see accompanying plate), and presenting, as an order, a series of well defined characteristics. Of these characteristics the most prominent are those furnished by the structure and arrangement of the teeth. No canine teeth are developed, the only teeth developed in these forms being incisors and molars. There are never more than two incisors in the lower jaw. With the exception of the Lagomorpha or Leporidae (Rabbits and Hares), which possess four incisors in the upper jaw, the upper jaw also in rodents is provided with only two incisors (see figs. 1, 4, 8, 15, and 25). These two additional incisors of the Leporidae are, however, of small size. The molar teeth and premolars are few in number, rarely exceeding four on each side of each jaw. They generally number from two to six on each side of the upper and from two to five on each side of the lower jaw. The incisors present a structure of characteristic kind, adapting them admirably for the gnawing operations of these forms. These teeth consist each of a front layer of hard enamel, the posterior part of each tooth consisting of the softer dentine or ivory substance. The result of this arrangement in these gnawing front teeth is to ensure the keeping of a persistent sharp edge, since the hinder and softer dentine, being worn away faster than the front and harder enamel, a chisel like shape is produced and maintained. And in addition to this structural arrangement, these teeth continue to grow from persistent pulps throughout life, so that provision is not only thus made for a sharp edge being kept up, but also for the due growth and formation of new tooth material. The incisors are of long, curved shape, and each forms a segment of a circle, the teeth being so brought into apposition that their power to effectually gnaw substances placed between them is exerted under the most favourable auspices. Between the incisors and molar teeth a wide *diastema* or interval exists. The molars consist of enamel, dentine, and cement, as in most other mammals, and their crowns may exhibit a laminated or tuberculate arrangement of parts. The teeth of rats and mice exhibit the latter feature, as shown in fig. 17. This structure of the molars has reference to the motion of the jaws in gnawing, the jaws of these animals being so articulated by the longitudinal position of the condyles that they slide backwards and forwards instead of vertically, as in other animals. The transverse ridges of the molar teeth act therefore in opposition to this sliding motion of the jaws in gnawing. The molars in some cases (as in the



Beavers) also grow from persistent pulps, and possess undivided fangs.

The feet possess usually five toes, each of these being armed with claws. Most Rodentia are of small size, the Capybara or River-hog (fig 24, see CAPYBARA), Beavers, and Porcupines presenting the most obvious exceptions to this rule. The great toe, when present, does not differ in form from the other digits, and variations are perceptible in the development of the thumb. Collar-bones or clavicles may be absent (as in Guinea-pigs) or present. The thigh generally possesses a third trochanter. The hind feet (as in Jerboas) may possess but three digits instead of the usual number, five, and the Capybaras, instead of nails, possess hoofed toes. The beaver again has the hind feet webbed, to adapt it for its semi-aquatic life (see figs 9 and 10). Some have the hind legs of extreme length, as the Jerboas (see illustration of Jumping Mouse, a member of this family, fig 12).

The stomach, generally of simple structure, may in some forms exhibit a tendency to become of compound nature, and its anterior portion (as in Beavers) may be provided with glandular appendages. This same portion in the dormouse is glandular and dilated so as to resemble the proventriculus or digestive stomach of birds. A large cæcum generally exists, and the intestine is usually very long. A gall-bladder is frequently wanting. The surfaces of the cerebral hemispheres or true brain are smooth or destitute of convolutions, and when viewed from above the cerebellum or lesser brain is seen to be in great part left uncovered by the cerebrum. The corpus callosum is well developed. The smoothness of the brain in rodents has induced Owen to include the rodents in his group of the *Lusencephala*, a sub-division of the Mammalian class, which, in his system of arrangement, also includes the Chiroptera (Bats), Insectivora (Hedgehogs, &c.), and Edentata (Sloths, Armadillos, &c.). The penis of rodents develops a bone, and the testes normally remain in the abdomen, but descend periodically into the groin at the breeding seasons. Vesiculæ seminales and prostatic glands exist. The uterus of the female is frequently completely divided into two cornua or horns, each of which cavities opens separately into the vagina. In others the two cornua unite to form a single uterus or womb. The placenta (which see) in Rodentia is of the deciduate type, and is of discoid conformation. The rodents are extremely prolific.

These animals are very generally distributed throughout the world, with the exception of Australia and Madagascar, indigenous rodents being unknown in the latter island. The food consists chiefly of plants, the rodents subsisting upon hard roots, nuts, and fruits, which they gnaw by means of their incisors. They may cause much destruction to the works of man through their gnawing habits. Many exhibit peculiar instincts, such as the nest and hut-building habits of the Beavers (which see), the migratory tendencies of the Lemmings (which see), &c. Some possess large cheek-pouches in which food may be stored up (See RAT). The skin, generally covered with hair, is spiny in the Porcupines (which see), some genera of which group possess prehensile tails. Many of these animals furnish furs of value in commerce.

The principal families of this order are the Leporidae, which includes the Hares and Rabbits and the Calling hares or Pikas, the Cavidae or Cavies, including the Guinea-pig, Aguti, Chinchilla, and Paca, (see the Plate, figs 19, 20, 22, and 23), the Hystricidae or Porcupines, including several forms besides the true porcupines (see PORCUPINE), the Castoridae or Beaver family, including, besides the beaver pro-

per, the Musquash and the Coypu; the Muridae or Mice, including Rats, Mice, Lemmings, Hamsters, Voles, &c. (see figs 11, 13-16, 21), the Myoxidae or Dormice (fig 5), the Sciuridae or Squirrels, and Marmots, Flying Squirrels, &c. (figs 1-4).

Rodent remains first occur in a fossil state in the Eocene period of the Kainozoic or Tertiary epoch, in which period remains of forms allied to the Dormice and Squirrels exist. In Pliocene and Post-Pliocene formations rodent remains become tolerably plentiful. Of the Post Tertiary forms, Trogontherium, or the Great Beaver, found in European deposits, is a familiar species, and the Cave Beaver (*Castor spelæus*) is also a notable form. Trogontherium may possibly have survived the human period.

The Hares and Rabbits first occur as fossils in Miocene and Pliocene deposits, the Porcupines in Pliocene and Post Pliocene formations of Europe and Asia, and the Rats and Mice in Miocene and Pliocene formations. The Guinea pigs are chiefly Post-Tertiary, their remains occurring in the Brazilian bone caves of that age (Lund).

RODERICK, last of the Visigoth kings of Spain, was, according to Spanish chroniclers, the son of Theodefred, duke of Cordova, the Arab historians, who are apparently more trustworthy, say he was of humble birth, but rose through his bravery to the command of the cavalry. A conspiracy which had been formed against Witiza, the reigning prince, by the nobles of Roman blood and the clergy, resulted in the deposition of that monarch and the elevation of Roderick to the throne in 709. The two sons of Witiza, bent on regaining their father's crown, formed a conspiracy, in which they were joined by their uncle Oppas, archbishop of Toledo and Seville, and Count Julian, governor of Ceuta, and to strengthen themselves for the contest, called in to their assistance the Arab chief Muza ibn Nozer, who had just completed the conquest of Mauritania. Julian treacherously surrendered Ceuta, the key of the whole country, and acted as the guide of the 12,000 Berbers whom Tark led into Spain. The Mussulmans landed at Algeiras, near Gibraltar (*Hebel al Tarik*, Mountain of Tarik), on the 28th April, 711, and defeated the army which Thodemir, governor of Andalusia, led against them. Informed of the invasion, Roderick, then engaged in reducing the savage tribes of Vasconia, immediately called the nation to arms, and advanced against Tark, with an army variously estimated at from 50,000 to 100,000 men, while the Arabs numbered only 25,000. The decisive battle commenced at Xeres de la Frontera, on the 24th July, 711, and lasted eight days. Roderick directed in person the centre of his army, and relying on the patriotism of Witiza's sons in the presence of the infidel invaders, he intrusted them with the command of the wings. On the third day of the battle Roderick was killed—in single combat with Tark, as the legends run. The Christians continued to fight desperately, but the issue was decided by the desertion of Witiza's sons to the enemy. The fate of Roderick is the theme of several Spanish romances of the fourteenth century, and of poems by Scott and Southey.

RODEZ, or RHODEZ, a town of France, capital of the department of Aveyron, on a height above the Aveyron, 85 miles north-west of Montpellier. It appears imposing at a distance, but has steep narrow streets and mean houses, mostly of wood, with projecting fronts. The chief objects of interest are the cathedral, with a lofty and singularly-constructed tower, the episcopal palace, the college originally Jesuit, the public library, town-house, prefecture, and old Cordelier monastery. The manufactures are serge, army clothing, and other fabrics, wax and

tallow candles, iron wares, and leather, and the trade is in these and in cheese, mules, and cattle Pop (1896), 11,443, of commune, 16,303

RODNEY, GEORGE BRYDGES, Baron Rodney, a naval commander, born in 1719 at Walton upon Thames His father, Captain Rodney of the Royal Marines, destined the son for the naval profession, and after a short stay at Harrow School the boy was sent to sea at the age of twelve years He became a lieutenant in 1739, first obtained a ship in 1742, and in 1749 went to Newfoundland as governor On his return in 1752 he was elected member of Parliament for Saltash In 1759, having been promoted to the rank of admiral, he commanded the expedition destined for the bombardment of Havre, which he executed with such success that the place has never recovered its former importance as an arsenal for war ships In 1761 he sailed to the West Indies, where he distinguished himself in the reduction of Martinique, and on his return was rewarded with a baronetcy A contested election for Northamptonshire (1768), together with serious losses at the gaming table, impaired his finances, and he found it necessary to retire to the Continent The French government made some overtures to him which would have recruited his fortune These he rejected, and the fact having transpired, he was placed in command of a squadron destined for the Mediterranean In 1780 he fell in with Admiral Langara's fleet off Cape St Vincent, and completely defeated it In 1781 he sailed for the West Indies, and defeated near Martinique the French fleet under the Count de Guichen, though badly supported by his subordinates, and April 12, 1782, obtained a decisive victory over the French fleet, under De Grasse, capturing five, and sinking one of his largest vessels The Count de Grasse was himself taken prisoner, and his flag ship, the *Ville de Paris*, with thirty six chests of money to pay the crowd of troops which loaded the French fleet, together with their whole train of artillery, fell into the hands of the victors The victory was the result of the daring manoeuvre of breaking through the enemy's line and placing it between two fires, a mode of attack which had been discontinued since the days of the Commonwealth A barony and a pension of £2000 were bestowed upon him for his services, and on his decease in 1792, a monument was voted to his memory, at the national expense, in St Paul's

RODOLPH (or RUDOLF) I, Emperor of Germany, founder of the imperial house of Austria, was born in 1218, being the eldest son of Albert IV, count of Hapsburg and landgrave of Alsace He was brought up in the court and camp of the Emperor Frederick II, and on the death of his father succeeded to territories of a very moderate extent, which, in the spirit of the times, he sought to augment by military enterprises In 1245 he married a daughter of the Count of Hohenberg, by whom he acquired an accession of territory, and, some years after, served under Ottokar, king of Bohemia, against the Pagan Prussians Several years of active warfare ensued, in which he much distinguished himself by his prudence, valour, and the spirit of justice with which he protected the inhabitants of the towns from their baronial oppressors In 1273, as he was encamped before the walls of Basel, he received the unexpected intelligence that he was elected King of the Romans, and emperor, in preference to Alphonso, king of Castile, and Ottokar, king of Bohemia Rodolph, then in his fifty fifth year, willingly accepted the proffered elevation, and, being crowned at Aix la Chapelle, immediately strengthened himself by marrying one of his daughters to Ludwig, count palatine of Bavaria,

and another to Albert, duke of Saxony He also took steps to gain the favour of Pope Gregory X., who induced the King of Castile to withdraw his pretensions The King of Bohemia, however, at that time one of the most powerful princes in Europe, persisted in his opposition, and a war ensued, in which he was defeated, and compelled to sue for peace, and agree to pay homage Stung by this disgrace the Bohemian king broke the treaty in 1277, and the following year Ottokar was defeated a second time, and slain By the treaty with his successor which followed, Rodolph was to hold Moravia for five years and retain the Austrian provinces, which had been previously yielded by Ottokar, and the securing of which to his family was henceforward his primary object After some abortive attempts to restore the influence of the empire in Tuscany he contented himself with drawing large sums from Lucca and other large cities for the confirmation and extension of their privileges No foreign foe remaining he assiduously employed himself to restore peace and order to Germany, and wisely put down the private fortresses, which served as a retreat to banditti and to ferocious nobles For these and other eminent services in the same spirit he obtained the title of 'a living law,' and was regarded as a second founder of the German Empire He subsequently engaged in war with the Counts of Savoy and of Burgundy, and delivered the young King of Bohemia from the captivity to which he had been subjected by the Regent Otho, and married him to one of his daughters The final object of the emperor was to secure the imperial succession to his son Albert, but the electors, jealous of the rapid rise of the family, could not be made to concur, and Rodolph felt the disappointment severely He had, however, laid a permanent foundation for the prosperity of his race, and after a reign of nineteen years expired in July, 1291 There is scarcely an excellence, either of body or mind, which the biographers of the house of Austria have not attributed to its founder and he appears to have merited no small portion of their panegyric Few princes have surpassed him in energy of character and in civil and military talents He was personally brave, almost to rashness, indefatigable, simple and unaffected in his manners, affable, and magnanimous In the beginning of his career he seems to have shared in the usual license of the period in pursuit of aggrandizement, but as an emperor he has been considered, for the most part as equitable and just as he was brave and intelligent

RODOSTO, a town of Turkey in Europe, in Roumelia, on the north shore of the Sea of Marmora, 77 miles west of Constantinople It is surrounded by embattled walls flanked with towers, and has many handsome streets, large caravanseries, and public baths The environs are covered with vineyards, producing an excellent wine, and there is an important trade in it and in corn and other products Pop about 20,000

ROE BUCK See DEER

ROE DEER (*Capreolus Caprea*), a genus of Cervidae or Deer (which see), of small size, the adult measuring about 2 feet at the shoulders and about 2½ feet at the hind quarters The horns or antlers are small, and provided with three short branches only The general body colour is a brown The tail has a white patch at its root, the belly and inner aspects of the limbs being of a grayish white colour The chin is of a white colour, and a white spot exists on each side of the lips These animals inhabit mountainous districts, and are monogamous, each male remaining faithful throughout life to one female When irritated or alarmed the Roe-deers may prove very dangerous adversaries, and are able to inflict

severe wounds with their antlers. Two young may be produced at a birth.

ROERMOND, or **RUREMONDE**, a town in Dutch Limburg, at the confluence of the Roer and Maas, 28 miles north by east of Maestricht. It is nearly surrounded by canals, and its fortifications have been converted into public walks. An elegant bridge over the Roer connects the town proper with the suburb of St Jakob. It is well built, and has among its edifices a large and beautiful parish church, an abbey, occupied partly as a church and partly as a prison and barracks, a royal college, a seminary, elegant courthouses, in what was once a bishop's palace and, above all, the Munsterkerk, a spacious and most beautiful Byzantine structure. The manufactures are woollen, silk, and cotton goods, paper, leather, shot, wax candles, &c. Pop (1890), 8984.

ROESKILDE, a seaport of Denmark, in the island of Zealand, on a fiord of the same name, forming a branch of the Cattegat, 18 miles west of Copenhagen, with which it is connected by railway. It is said to have been founded by the Pagan King Roe in the fifth century, became the residence of King Harald in 980, and soon rose to be among the most important towns of Denmark. It contains a palace, an ancient and beautiful cathedral, founded in 1084 by Canute the Holy, a cathedral school and institute for female nobility, and has mineral springs in high repute, and a winter haven, admitting vessels drawing 9 feet of water. Pop (1890) 6974.

ROGATION DAYS (*Lat. rogatio*, a request), the Monday, Tuesday, and Wednesday before Holy Thursday or Ascension Day, so called from the supplications or litanies which are appointed in the ritual to be sung or recited in public procession by the clergy and people. It is said that Claudius Mamercus, bishop of Vienne about the middle of the fifth century, ordered these days to be observed as public fasts, with solemn processions and supplications on the occasion of some great public calamity. The arrangement was imitated and repeated, and at last it became a law in the Latin Church that these days should be annually observed as fasts, with processions and supplications to secure a blessing on the fruits of the earth and the temporal interests of men. The week in which they occur is called Rogation Week, and the Sunday of the week Rogation Sunday. At the Reformation the Anglican Church discontinued the public processions, but ordered these days to be observed as private fasts. They have also received the name of Gang or Gange Days from the ancient custom of perambulating the boundaries of the parishes on these days—a custom still kept up in some places.

ROGER I, Count of Sicily, one of the numerous sons of Tancred de Hauteville, a Norman baron in France, was born about 1031. Roger's brothers, Drago, Humfrey, William, and Robert Guiscard, had acquired fame in Italy, and obtained possession of the county of Aversa, when he also was summoned thither by his brother, Robert Guiscard, and landed in Apulia in 1057. The two brothers, Robert, the eldest, and Roger, the youngest, founded the Kingdom of the Two Sicilies. Roger in 1063 defeated the Saracens at Ceramium, and was thereupon confirmed by the pope in all his conquests in Sicily. He took the title of Count of Sicily, but owing to a dispute with his brother relative to the province of Calabria on the mainland, of which Robert refused to cede the half to Roger according to promise, a fierce war broke out between the brothers. It was appeased, however, in process of time, and the complete subjugation of Sicily was the result of their conjoint operations. After the death of Robert Guiscard in 1085 the Norman power in Italy came into Roger's

hands. The general support given to him by the pope freed him from many dangers. In 1098 he gave him a free brief, the genuineness of which has, however, been questioned, that he would send no legate to Sicily without Roger's consent, and left it to him to decide what bishops should attend the general assemblies of the church and whom he should detain for the service of the kingdom. With this extension of his spiritual rights Roger introduced many important improvements, establishing schools in Salerno, &c. He died, at the age of seventy, in 1101.

ROGER II, King of Sicily, second son of the above, at his father's death was only five years of age. His elder brother, Simon, died in 1102, and during his minority the government was administered first by his mother, Adhelheid, a daughter of the Margrave Boniface of Montserrat, and then by Prince Robert of Burgundy. His lofty stature, dark eye, and powerful voice bespoke one born for dominion, and his inflexible decision and perseverance in all matters of business kept his kingdom together and brought unity and order into it. The free barons of the land, however, leagued with Pope Honorius II to break the Norman ascendancy. They had no success, and the pope voluntarily confirmed Roger in the possession of Apulia and Calabria. Pope Anacletus extended the confirmation to Capua and Naples, and in 1130 he was honoured with the title of king. He now pressed so hard upon the barons that Rainulf of Avellino, Robert of Capua, Servius of Naples, and others revolted, receiving support from the German and Greek emperors, Lothar and Emmanuel, and the influence of the anti pope, Innocent II, who excommunicated the Sicilian monarch. Roger in 1132 was defeated by them in an engagement, but having promptly assembled a new army suddenly recovered all he had lost, and although the revolt lasted till 1136 it terminated to Roger's advantage. When he had brought his kingdom into order the hope of gain and hatred of the infidels led him over to Africa in 1146. He took Malta and the adjacent islands, and afterwards made himself master of Tripoli. With a second fleet he sailed to Mada, and took it in 1148. At the same time he led an expedition against the Kingdom of Greece, in which he took Corfu and Thbes, and plundered Corinth, Athens, Cephalonia, and Negropont, returning with an immense booty. In 1152 he extended his dominion from Tripoli to Tunis, and from the desert of Mohrab to Kairwan. The peace which followed he turned to good account, reforming the law, introducing order into the administration, patronizing science, building palaces, forming parks, fish ponds, introducing the silk manufacture into Sicily, &c. He died in 1154, predeceased by four sons, and leaving a tranquil, powerful, and universally honoured kingdom, which he had founded by his valour, and maintained by his prudence and firmness, to his feeble and almost imbecile fifth son, William I.

ROGER DE HOVEDEN See **HOVEDEN** (ROGER DE).

ROGERS, SAMUEL, an eminent poet, was born at Stoke Newington, London, July 30, 1763. His father was a leading member of a Dissenting congregation, and a banker by profession. After completing his attendance at school, young Rogers entered the banking establishment as a clerk, but his favourite pursuits were poetry and literature, and he is said to have meditated submitting some of his juvenile productions to Dr Johnson, who, however, died before the young poet could summon up courage to effect the execution of his purpose. His first appearance before the public was in 1786, when he gave to the world his *Ode to Superstition*, and other Poems.

Shortly after this he visited France and also Scotland, and was introduced to many of the leading literary celebrities of the day in both countries. His great poem, the *Pleasures of Memory*, with which his name is principally identified, appeared in 1792. It is a carefully finished and graceful production, but somewhat deficient in force and vigour, and though every one is familiar with the name, the *Pleasures of Memory* is a poem that at the present day is comparatively little read. It was received with unbounded applause, and the reputation of the author was still further confirmed by the publication in 1798 of *An Epistle to a Friend* and other Poems. On the death of his father in 1793 he retired in a great measure from the banking house, leaving its management to a younger brother, but retaining still an interest in the concern as a partner. About the same time also he removed to apartments in the Temple, which he quitted in 1803 for the celebrated house in St James' Place, occupied by him to the close of his life. Enabled by his wealth to gratify without restriction his love of letters and the fine arts, he spent his days in independence and ease, enjoying the friendship of the most distinguished men of the day, and surrounding himself with all the appliances of art and literature. His house, adorned with the finest specimens of painting and sculpture, was a veritable temple of the fine arts, and a general rendezvous for the world of intellect and fashion. It ought also to be recorded that, though bitter of tongue, no man was more generous in relieving distress or assisting struggling genius, and Sheridan, Moore, Campbell, and others, were all indebted at different times to his generous liberality. After twelve years of silence he published in 1810 his poem of *Columbus*, which was severely handled by the *Quarterly Review*, and met with little success. *Jacqueline, a Tale*, appeared in 1814, bound up in the same volume with *Lord Byron's Lara*, published by Murray. The same year he visited Paris, extending his tour to Italy, and remained abroad for several years. On his return in 1819 he published the poem of *Human Life*, which went through several editions. In 1822 appeared the first part of his *Italy*, a series of poems descriptive of the scenery and antiquities of that country, and perhaps the finest of all his works. Continuations of it followed at successive periods, and a complete edition was published in 1830, beautifully illustrated by Prout, Stothard, and Turner, which, with an illustrated edition of his other poems, comprises two 8vo volumes, and was issued at an outlay to the author of nearly £15,000. It proved, however, a remunerative speculation. Till within a few years of his death, when he was accidentally run over by a carriage, and confined for the remainder of his days to a chair, Rogers was a man of extremely active habits, taking a great deal of pedestrian exercise, and was a frequent attendant at operas, concerts, and oratorios. A short time previous to this mishap he had been offered the laureateship, vacated by the death of Wordsworth, but declined the appointment, which was bestowed on Tennyson. Though now unable to move about except in a carriage he enjoyed the society of his friends to the last, and expired in his ninety-third year, on 18th December, 1855. His unique collection of works of art was disposed of by auction after his death. A volume of his *Table Talk*, renowned for shrewd remark and anecdote, was published by Alexander Dyce (1856). See also P. W. Clayden's *Early Life of Samuel Rogers* (1887), and Rogers and his Contemporaries (1889).

ROHAN, HENRI, DUKE OF, was born in 1579, at the castle of Blain, in Brittany, and brought up in the Reformed Church by his parents. In his sixteenth year he joined the court of Henry IV., whose

childless marriage led him to entertain the hope that, as a very near relative of that king, he might one day succeed him in Navarre. He accompanied Henry in his campaigns, and afterwards travelled through France, Italy, Germany, and England. In 1603 he was appointed duke and peer of France. He married Margaret de Béthune, daughter of Sully. In 1610 the assassination of the king dashed all his hopes. The opposite parties again flew to arms. Rohan placed himself at the head of the Calvinists. But Louis XIII. was not the man to grant religious toleration, and Richelieu, the all-powerful minister, annihilated the political existence of the Huguenots. La Rochelle fell in 1628, and the peace of 1629 gave the Protestants of France their death blow. Rohan withdrew from his native land, and in exile wrote his *Mémoires sur les choses advenues en France depuis la Mort de Henri IV.*, &c. (Paris, 1630). In the wars of Venice against Austria he commanded the troops of the republic till the Peace of Cherasco in 1631. Hereupon he was appointed by Richelieu French ambassador to Switzerland. He also headed the French army in the Grisons, and defended the Valteline against the Spaniards and Germans. After the annihilation of the Spanish force at the Lake of Como in 1636, the French indulging in all kinds of cruelty led to a revolt. Rohan, unable to quell it, was taken prisoner, and did not regain his freedom till he had promised to evacuate the territory. He went after this to Geneva, where he composed his *Mémoires et Lettres sur la Guerre de la Valteline* (three vols. Geneva, 1638). In Germany the Roman Catholic league had let loose the furies of war. Inspired with zeal for the relief of his brethren in the faith, he in 1638 joined Bernard of Weimar, who was then commanding the Protestant army on the Rhine. He was severely wounded at the battle of Rheinfelden, 24th February, 1638, and died on the 13th April following. His wife, who attended him in all his campaigns, and had in 1625 heroically defended Castrès against the royalists, died at Paris in 1660. Besides the works mentioned above he wrote *Les Intérêts des Princes* (Paris, 1649), *Traité du Gouvernement des Treize Cantons* (Paris, 1649), and *Discours Politiques* (Paris, 1663).

ROHAN, LOUIS RENÉ FIDOUARD, PRINCE DE, Cardinal Bishop of Strasburg, was born in 1734 at Paris. The dissipation in which the young ecclesiastic indulged did not prevent him from attending to study, nor from forming ambitious projects. In 1772 he went as ambassador to the court of Vienna. He derives his notoriety, however, chiefly from the affair of the necklace (See ANTOINETTE (MARIE), and LAMOTTE). He was then grand almoner of France, and being thrown into the Bastille, continued in prison more than a year, when he was acquitted and released by the Parliament of Paris, August, 1786. He was afterwards a member of the constituent assembly, but, on account of his opposition to the revolutionary principles, was obliged to retire to Germany, where he died in 1803. See the *Mémoires* of Georcel, Campan, &c., and the *Recueil des Pièces concernant l'Affaire du Collier*.

ROHILKHAND, or ROHLOUND, a division of British India, bounded north by the Himalayas, separating it from Kumaon, west and south west by the Ganges, and east and south east by the commissionaryship of Oudh, area, 10,885 square miles, pop. 5,343,674. The surface is a plain, with a gradual slope south, in which direction its principal streams, Ramganga, Doohia, and others, flow. Its north frontier is occupied by an extensive forest, elsewhere palms, the sugar cane, cotton, and the finer fruits of the temperate zone flourish. It takes its name from the Rohillas, an Afghan tribe, who gained possession of

It early in the eighteenth century. It forms a commissioner's division of the North west Provinces of the Bengal Presidency, and is subdivided into the districts Bijnur, Muradabad, Budaon, Bareilly, Terai, and Shahjahanpur. It includes the native principality of Rampur.

ROLAND, or **ORLANDO**, a celebrated hero of the romances of chivalry, and one of the paladins of Charlemagne, of whom he is represented as the nephew. His character is that of a brave, unsuspicious, and loyal warrior, but somewhat simple in his disposition. According to the Song of Roland, which forms part of the Chansons de Geste, Charlemagne, after a six years' stay in Spain, resolved to return home. By the advice of Roland the emperor sent Ganelon to Saragossa to receive the homage of the Saracen king Marsilius. This mission had been fatal to all who had been formerly sent on it, and Ganelon, to revenge himself on Roland, betrayed to Marsilius the line of march of the Christian army. Marsilius collects an immense host, allows Charlemagne to cross the Pyrenees with the main body of his force, and falls upon the rear guard commanded by Roland. A desperate struggle ensued, 100,000 infidels fell, and Roland had only 50 remaining of the 20,000 warriors whom he had led into the narrow pass of Roncesvalles (Roncesvaux). Another pagan army hastens up, seeing himself now fairly overpowered. Roland at last sounds his enchanted horn, which is heard beyond the mountains by the emperor. The traitor Ganelon, however, deceives Charlemagne with the assurance that Roland is only engaged on a deer hunt. Thrice the sound of the ivory horn is heard and unanswered, but another blast, the violence of which cracked Roland's temples, alarmed the emperor for the safety of his favourite warrior. He hurries up to his assistance, but it is too late. Roland, wounded in many places, has dragged himself to die at the foot of a tree, has sung his death song and thrown down his enchanted sword Durandal and the ivory horn, and covered them with his body. Nothing remains but to avenge the death of the hero, and this Charlemagne does in a series of bloody victories, with the narration of which the poem closes. The celebrated romantic epics of Boiardo (Orlando Innamorato) and Ariosto (Orlando Furioso) relate to Roland and his exploits.

ROLAND, **JEAN MARIE DE LA PLATIERE**, born at Thizy, near Villefranche (Beaujolais), in 1734, was, previous to the revolution, engaged in manufactures. Being sent to Paris by the city of Lyons, on official business before the national assembly (1791), he became connected with Brissot and other popular leaders, through whose influence he was appointed minister of the interior in 1792. His principles, however, were so far from being agreeable to the king that he was dismissed after a few months, but after the 10th of August he was recalled to the ministry, and continued to hold his place until the proscription of the Girondists compelled him to leave Paris. On receiving at Rouen the news of the death of his wife he killed himself with a sword cane. Roland was the author of the Dictionary of Manufactures, three vols. 4to, forming part of the Encyclopédie Méthodique, and of several other works. His wife, **MARIE JEANNE PHILIPON**, was born at Paris in 1754, and was the daughter of an engraver. She was remarkable for her beauty, and received an excellent education. The study of Greek and Roman history early inflamed her imagination, and gave her a tendency to republican sentiments. After her marriage in 1779 Madame Roland took part in the studies and tasks of her husband, and accompanied him to Switzerland and England. The revolution found in her a ready convert to its principles, and on the appointment

of her husband to the ministry she participated in his official duties, writing and preparing many papers, and taking a share in the political councils of the leaders of the Girondist party (See GIRONDISTS). On the fall of her husband she was arrested. She conducted herself with great firmness during the trial, and at the time of her execution. 'Oh Liberty, what crimes are committed in thy name!' was her exclamation when she arrived at the scaffold, Nov. 8, 1793. While in prison she wrote Memoirs of her Life, which were afterwards published with her other writings relating to the events of the revolution. The most recent edition is that of J. Chastin (1894). See works by Lamy (1881), Bader (1892) and Ducas (1895) and the Correspondance de Madame Roland (1901) by C. Perron.

ROLLER. See AGRICULTURAL IMPLEMENTS.

ROLLER (*Coracias*), a genus of INSCISSORIAL Birds (see INSCISSORES) included in the PERNICIFORMES section of that order, and forming at once the type of the family Coraciidae and of the subfamily Coraciinae. The bill in these birds is of elongated form and compressed shape. It is high and broad at the base, and hooked at its tip. The upper mandible overhangs the lower one. The nostrils are pierced at the base of the mandible. The toes are free, and not united at their bases. These birds are generally of small size. They frequently exhibit brilliant colours in their plumage, and are confined in their distribution to the eastern hemisphere. The food consists partly of insects and partly of nuts and fruits.

The Common Roller (*Coracias garrula*, see PL I at ORNITHOLOGY) is found in Europe, but only occasionally visits Great Britain. Africa indeed appears to be its native country, whence they migrate in summer northwards into Europe, even as far as Sweden. They breed in Europe. In size the Roller averages the Common Jay. The back is of a light brown colour. The head is bluish green, as also are the neck and lower surfaces. The lesser coverts of the wings are coloured of a bright blue, the tail feathers are blue, with a greenish lustre, whilst several of the outer tail feathers may be tipped with black. The voice is noisy and harsh. In habits these birds are shy, and frequent forest depths and secluded spots. The eggs are frequently deposited in the holes of trees, and birch trees are said to be preferred by these birds for this purpose. The German name of Birkhüher or Birch Jay has been given to the Roller in allusion to this habit. At other times and elsewhere it may deposit its eggs in holes in river banks after the fashion of the Kingfishers. The eggs number four, and are of a pure white colour. The food consists chiefly of insects, worms, slugs, and small reptiles, but fruits form part of its dietary. In the male birds the outer tail feathers are said to be a little longer than in the females, whilst in both sexes of this species the tail is comparatively square or even. In an Abyssinian species (*C. Abyssinica*) the outer feathers of the tail are elongated, and terminate in long, slender filaments. The genus *Eurystomus* is nearly allied to that of the typical Rollers (*Coracias*), but the bill in the *Eurystomi* is broad and depressed, and these latter forms hunt their insect-prey on the wing.

ROLLIN, **CHARLES**, a historian, was born at Paris in 1661. His father was a cutler, who intended him for the same business, but his talents obtained the notice of a learned Benedictine, who procured him a place in the College of Du Plessis, by which he was enabled to gratify his inclination for learning. After going through a course of theology at the Sorbonne he received the tonsure. In 1688 he obtained the chair of eloquence in the royal college, of which he became rector in 1694, reformed the academical

course in many particulars, and revived the study of the Greek language. In 1698 he was chosen coadjutor or head of the College of Beauvais, which was also much benefited by his attention. In 1720 he was again chosen rector of the University of Paris, but was displaced in consequence of his connection with the Jansenists. His productions are *Traité des Études* (four vols 12mo, 1726-31), *Histoire Ancienne* (twelve vols 1730 and 1738), and *Histoire Romaine* (five vols) to the war against the Cimbri (completed by Crevier, sixteen vols 12mo). He died in 1741. Rollin's writings are distinguished for purity and elegance of style, but they are diffuse and prolix, and his historical works are deficient in critical sagacity. There is an edition of his works in thirty vols 8vo (Paris, 1827), with notes on the historical parts by Guizot. His *Ancient History* has been often reprinted in English, but is now quite out of date.

ROLLING MILL, in mechanics, a machine for reducing masses of iron, copper, silver, or other metals to bars or plates. This is effected by passing the metal whilst red hot between two cylindrical steel rollers mounted on a massive frame, which has to support a very powerful strain. The rollers are connected by cog wheels placed upon their axes, upon the lowermost of these works also the wheel by means of which the revolution is communicated. For rolling bars the rollers are grooved, for plates they are plain (fig 9. Plate I., at art IRON). Rolling mills are also used for the manufacture of rails, the rollers being so grooved and moulded as to give the rail its shape. It has to pass through five or six gradually diminished apertures before it is finished. Tubes of brass, copper, tin, &c., are also produced by the rolling mill, a mandrel being fitted inside the tube to sustain the pressure of the rollers, which may be engraved so as to impress a pattern on the metal as it passes through. See IRON.

ROLLS, MASTER OF THE. See MASTER OF THE ROLLS.

ROMAIC. See GREEK, division Modern Greek Language and Literature.

ROMAN ARCHITECTURE. See ARCHITECTURE.

ROMAN CATHOLIC CHURCH that society of Christians which acknowledges the Bishop of Rome as its visible head. The following account of the doctrines held by them is derived from sources considered as genuine by the Roman Catholics themselves. We shall not enter into any explanations of the doctrines about to be laid down, nor into any statement of the grounds on which they are held.

The claim of supremacy on the part of the Bishop of Rome is founded on the belief that our Lord conferred on Peter a primacy of jurisdiction, that that apostle fixed his see at Rome, where he consecrated a successor before his martyrdom there and that thus the bishops of Rome, in unbroken succession from Peter, have succeeded to his prerogative of supremacy. The formality of faith which persons becoming members of the Catholic Church are expected to recite and which is sworn to upon taking any degree, or being appointed to a professorship, is the creed of Pius IV., which is in substance as follows—

I, N. N., with a firm faith believe and profess all and every one of those things contained in that creed which the Holy Roman Church maketh use of—to wit I believe in one God, the Father Almighty, maker of heaven and earth, of all things visible and invisible, and in one Lord Jesus Christ, the only begotten Son, born of the Father before all ages, God of God, Light of Light, true God of the true God, begotten, not made, consubstantial with the Father, by whom all things were made. Who for us

men, and for our salvation, came down from heaven, and was incarnate by the Holy Ghost of the Virgin Mary, and was made man. He was crucified also for us under Pontius Pilate, suffered and was buried, and the third day He rose again, according to the Scriptures, He ascended into heaven, sitteth at the right hand of the Father, and shall come again with glory to judge the living and the dead, of whose kingdom there shall be no end. I believe in the Holy Ghost, the Lord and life giver, who proceedeth from the Father and the Son, who together with the Father and the Son is adored and glorified, who spake by the prophets. And I believe in one Holy Catholic and Apostolic Church, I confess one baptism for the remission of sins, and I look for the resurrection of the dead and the life of the world to come. Amen.—I most steadfastly admit and embrace apostolical and ecclesiastical traditions, and all other observances and constitutions of the same church.—I also admit the Holy Scriptures according to that sense which our Holy Mother the Church has held and does hold, to which it belongs to judge of the true sense and interpretation of the Scriptures: neither will I take and interpret them otherwise than according to the unanimous consent of the fathers.—I also profess that there are truly and properly seven sacraments of the new law, instituted by Jesus Christ our Lord, and necessary for the salvation of mankind, though not all for every one—to wit baptism, confirmation, the eucharist, penance (which includes confession), extreme unction, holy orders, and matrimony, and that they confer grace, and that of these baptism, confirmation, and order cannot be reiterated without sacrifice. I also receive and admit the received and adopted ceremonies of the Catholic Church used in the solemn administration of the aforesaid sacraments. I embrace and receive all and every one of the things which have been defined and declared in the holy Council of Trent concerning original sin and justification. I profess, likewise, that in the mass there is offered to God a true, proper and propitiatory sacrifice for the living and the dead, and that in the most holy sacrament of the eucharist there is really, truly, and substantially the body and blood, together with the soul and divinity of our Lord Jesus Christ, and that there is made a conversion of the whole substance of the bread into the body and of the wine into the blood, which conversion the church calleth transubstantiation. I also confess that under either kind alone Christ is received whole and entire and a true sacrament. I constantly hold that there is a purgatory, and the souls therein detained are helped by the suffrages of the faithful. Likewise that the saints reigning together with Christ are to be honoured and invoked, and that they offer prayers to God for us, and that their relics are to be held in veneration. I most firmly assert that the images of Christ, of the mother of God ever virgin, and also of other saints, ought to be had and retained, and that due honour and veneration are to be given them. I also affirm that the power of indulgences was left by Christ in the church, and that the use of them is most wholesome to Christian people. I acknowledge the Holy Catholic Apostolic Roman Church for the mother and mistress of all churches, and I promise true obedience to the Bishop of Rome, successor of St. Peter, prince of the apostles and vicar of Jesus Christ. I likewise undoubtingly receive and profess all other things delivered, defined, and declared, particularly by the holy Council of Trent, and I condemn, reject, and anathematize all things contrary thereto, and all heresies which the Church has condemned, rejected, and anathematized.—I, N. N., do at this moment freely profess and sincerely hold this

true Catholic faith, out of which no one can be saved, and I promise most constantly to retain the same entire and inviolate, by God's assistance, to the end of my life.

In addition to the doctrines here specified other articles have at later periods been added, the more noteworthy being the doctrines of the immaculate conception of the blessed Virgin Mary (see CONCEPTION—IMMACULATE) and of the infallibility of the pope (see INFALLIBILITY).

By discipline Catholics understand all that relates to the government of the church, the administration of the sacraments, and the observances and practices of religion. The essential worship consists in the sacrifice of the mass, which, although mystical and commemorative, is real and propitiatory, being a continuation of the sacrifice of the cross. Vespers are solemnly sung, the Psalms of David with the song of the Virgin, and pious hymns and prayers being employed. Other portions of the divine office are sung in the cathedral churches at various hours each day by clergymen called canons, who are devoted to this duty. Besides Sunday, festivals are celebrated to honour the divine mysteries and present them to the devout contemplation of the faithful. Many are solemnized in honour of the Virgin, the apostles, martyrs, confessors, virgins, and saints of every class, whose virtues are thus set before the faithful for imitation. Fasting forms also a part of discipline. The forty days of Lent are the chief season for fasting. Ember days, namely, Wednesday, Friday, and Saturday in each of the four seasons are observed as fasts to obtain the divine blessing for the seasons. The eve of great solemnities is observed by fasting, in order to prepare by penance for their celebration. Abstinence is observed on each Friday of the year, and in many places on Saturday. All these penitential observances are matters of church law, which admits of dispensation. The Latin liturgy, used from early times in the church, is still employed by the celebrant, which serves to connect ancient and modern times, and proves their harmony of worship. Confession of sins to a priest is required of all Catholics, and before absolution penance is enjoined, and is proportioned to the degree of the offence. The clergy of the church in the West are bound by a vow of celibacy, not formally made, but implied in their ordination as subdeacons. This obligation is only reckoned among the disciplinary enactments, and subject to variation under certain circumstances. The clergy of that portion of the Greek and Armenian Church which is united in communion with the see of Rome may receive orders if married, but are not allowed to marry after having taken orders.

The constitutive principle of the Catholic Church, which gives it individuality, pervades all its institutions, and answers all queries regarding the peculiar constitution, outward and inward, of the church, is the doctrine that God has promised, and therefore bestows upon it, a constant protection, guarding it from destruction, error, or fatal corruption. From this principle there necessarily follow the infallibility of the church in its decisions on matters of faith, the obligation of submitting to those decisions independently of men's own private judgments, the authority of tradition, or the unalterable character of all the doctrines committed to the church, the necessity of religious unity by perfect uniformity of belief, and thence the sinfulness of wilful separation or schism and culpable errors of heresy, government by authority, the Papal supremacy and infallibility, which is considered as a necessary provision for the preservation of unity, or as the principal depository of the divine promises, the authority of councils, the right

to enact canons and ceremonies, and, the duty of repressing all attempts to spread new or heretical opinions.

It may be necessary to add that under the generic name of Roman Catholics are comprised all churches which recognize the supremacy of the Pope of Rome, though they may not be of the Latin rite. Under this designation are included the united Greeks, Slavonians, Ruthenians, Syrians (together with the Maronites), Copts, and Armenians. Those churches retain their own national liturgy and language, and in a great measure their established discipline and usages. It has been computed that the Roman Catholic Church counts within her fold over the whole world 210,000,000 members, of whom 146,000,000 belong to Europe. For a history of the church see the article on POPE.

ROMAN CATHOLIC EMANCIPATION. See CATHOLIC EMANCIPATION.

ROMANCE, a fictitious narrative in prose or verse, the interest of which turns upon incidents either marvellous or uncommon. The name is derived from the class of languages in which such narratives in modern times were first widely known and circulated: these were the French, Italian, and Spanish, called the *Romanic Languages* (which see). We have already given some general views of the origin and character of prose fiction under the head of NOVEL, and intend to confine our remarks at present to the subject of those forms of metrical romance which flourished during the middle ages. The finest of these romances still extant are of the twelfth and thirteenth centuries. They may be divided into two classes—the popular epics (*chansons de geste*) chanted by the jongleurs and other strolling minstrels, and the more elaborate and artificial poems which were composed by the court poets and sung to the kings and his nobles. The materials of both classes were more ancient lays of celebrated heroes, mingled frequently, especially in the German romances, with pagan myths, together with long connecting passages composed by the minstrels themselves. Hence originated a series of epics grouped around some renowned hero, and forming a cycle of romance. To the first class belong the German heroic poems and the Carolingian chansons, to the second the Arthurian legends.

Of the collection of the ancient German lays made by Charlemagne, who, as Eginhard informs us, took a vast delight in the poems wherein the deeds and wars of the men of old were sung, nothing remains except perhaps the fragment of the alliterative Lay of Hildebrand, now in the Cassel Library. It is supposed to have been written in the ninth century or even earlier. All the other manuscripts of German heroic poems are of much later date, none of them are earlier than the thirteenth, and most of them belong to the fourteenth or fifteenth centuries. Of the Nibelungenlied (which see) there are three copies belonging to the thirteenth century. In this epic Dietrich plays an important part, but the poems devoted to the simple Dietrich legend are only found in late transcripts or early printed editions, probably little later than the date of their actual composition. They represent, however, older lays, and these again still older, of equal or even greater antiquity by two centuries or more than the Cassel fragment. The language changed considerably in the course of these centuries, and the poems must have been entirely recast, rhyme being substituted for alliteration, but the change in the legend itself is immaterial. It can be traced in the Latin chronicles of the tenth and eleventh centuries, and also by means of the *Vilkins Saga*, an Icelandic prose work of the thirteenth century. The leading features of the legend are as

follows — Ermanrich, head king of all the Goths in the Roman Empire, has been inspired with jealousy and distrust of his nephew, Dietrich of Bern (Theodoric of Verona), by means of ill reports of the treacherous councillor, called in the Cassel fragment Ottaker, but in the later poems Gibich. Dietrich takes flight, accompanied by his old tutor in arms Master Hildebrand, and is received by Etzel (Attila). Dietrich's flight, and his subsequent defeat of Ermanrich, form the subjects of Dietrich's Flucht and the Rabenschlacht (Battle of Ravenna). A slightly varied narrative of the same events is found in Alphart's Tod. In Ecken Ausfahrt the narration of the early exploits of Dietrich excites the young warrior Eckr, who sets out to pit himself against the hero, by whom he is involuntarily killed. These poems, as well as others on similar subjects, range from a few hundred to several thousand lines in length. Some of them were modernized by Caspar von der Rohn, and inserted in his Heldenbuch. The complete collection is that in Heinrich von der Hagen's *Altdeutsche Heldenlieder* (Leipzig, 1855). Another poem closely connected with the Nibelungenlied is the Latin epic of Walter of Aquitaine, attributed to Eckehard I, abbot of St Gall, who died in 973, and who is said to have written it as an exercise in his youth. It is obviously a translation from a German poem, and is found in several manuscripts, none of them perhaps older than the twelfth century. The *Klage* (Lament), said by W. Grimm and others to be a poem of the twelfth century, forms a sort of conclusion to the great German epic, and another poem, *Iterolf*, is ascribed to the same unknown author. It extends to a length of 13,000 lines, and contains a great number of daring adventures, in the course of which Dietrich encounters and vanquishes Siegfried. Gudrun is a fine epic, consisting of nearly 7000 lines, and is of not much later date than the Nibelungenlied. It narrates the adventures of an Irish king, Hagen, the elopement of his daughter with the envoys of Hettel, a king in Irisland, the reconciliation of Hagen and Hettel, the violent abduction of Gudrun, Hettel's daughter, by Hartmut of Ormanie (or Normand), as it is sometimes written in the poem), her recovery by her lover, Herwig of Scotland. The *Rosengarten* is a poem of much later composition, dating probably from the thirteenth century. It relates how Christmild, having a rose garden at Worms defended by twelve valiant knights, at the head of whom is her betrothed, Siegfried challenges the South German heroes to violate it. Every warrior who can vanquish one of her champions is to receive a kiss and a chaplet of roses. In the end the Burgundians are defeated, and Siegfried is compelled to yield to Dietrich. We can only mention the names of the poems which make up what has been called the Lombard sub-cycle, namely, *König Rother*, *Wolfdietrich* (including *Hugdietrich*), and *Ottat*, which latter furnishes the materials for the French poem *Huon de Bordeaux*. Frederick Barbarossa was a great admirer of Charlemagne, and collected all the accredited records of that monarch. He patronized the Minnesingers as the German representatives of the troubadours. At his great Mainz tournament were assembled not only the knights of Germany and France, but the poets also. Among those present was Heinrich von Veldeke, who imitated the Roman d'Eneas in his *Eneit*, an example which was quickly followed by the chief leading epic poets of Germany. Heinrich completed his poem at the Wartburg, the residence of Hermann, landgrave of Thuringia, and many other translations, among others that of the *Roman de Troie*, were executed there shortly afterwards. Another guest of the landgrave's was Wolfram von Eschenbach, author of *Parzival*, a romance

belonging to the Arthurian cycle, and of *Willehalm* (William of Orange, a contemporary of Charlemagne), an unfinished epic which is connected with the Carolingian cycle.

We now come to the romances of French origin. These poetic fictions (*chansons de geste*, as they are called) form a very large and interesting body of literature. The oldest of them are of great length, consisting generally of 20,000, 30,000, or even as many as 56,000 lines, grouped in sets (*tirades*) of from 20 to 200 lines, all ending with the same assonantal rhyme. Up till the middle of the twelfth century the lines were of ten syllables, but lines of twelve syllables, ending in consonantal rhymes, were gradually substituted. The romances were sung to the sound of a kind of violin (*vielle*), played with a regular bow. Many of the minstrels (*jongleurs*) were poor, wandering on foot from village to village, singing in the ale houses, or at the public fairs and games, others were comparatively well off, and were welcomed in the palace or the baronial hall, some were soldiers, such as Taillefer, who struck the first blow at Hastings. A number of them wrote their own chansons, while others bought them from their original authors, and adapted them to the taste of their audience. When a jongleur had thus procured a copy he took care to conceal it from his rivals. A few of such copies, little weather-beaten volumes, are still preserved, a noted example being the Oxford MS of the *Chanson de Roland*. It was to the poets of Northern and Central France rather than to the troubadours of Provence that these poems were due. The chansons de geste are divided into three cycles — that relating to Charlemagne and his peers, the Arthurian, and the classical. The more antique the Charlemagne romances are the more they are devoted to the emperor, who is represented more as a majestic king and valiant knight than as the statesman we recognize him in history to be, at times he is depicted as being easily duped, avaricious, and capricious. Aspremont, a chanson of about 10,000 lines, recast in the beginning of the thirteenth century, relates how Roland, at the age of fifteen years, along with three other royal wards, escape from the castle of Laon and join the French army on its way to chastise Agolant, a Saracen invader of South Italy, who had died Charlemagne. At the battle of Aspremont the emperor himself is hard pressed by Esmont, son of Agolant, Roland rescues his uncle, and kills Esmont with his own sword Durandal. At the close of the battle Roland is knighted, and girt with Durandal. Girard de Viane is a poem of about 6500 lines, composed by Bertrand, a clerk of Bar-sur-Aube, about the beginning of the thirteenth century. The rebellious Girard has been besieged by Charlemagne for a lengthened period. The issue of the struggle is about to be decided in single combat by Roland and Olivier, Girard's nephew, a cloud separates the two combatants, and an angel commands them to unite together against the infidel, their common foe, Roland is betrothed to Aude, the sister of Olivier, and the two young paladins become henceforward faithful companions in arms. Ferabras (French) or Fierabras (in Provençal), a romance of over 6200 Alexandrines, belongs to the same date. Charlemagne advances against a Saracen fortress in Spain to recover the crown of thorns, the nails, and other relics of the passion. Ferabras, the emir's gigantic son, challenges any of the twelve peers to single combat. Olivier claims the combat, vanquishes Ferabras, and converts him to the true faith. The *Chanson de Roland* consists of about 4000 lines, and was composed about the close of the tenth century (See *ROLAND*). Ogier le Danois contains over 12,000 lines, and was written about the beginning of the

thirteenth century Ogier is a hostage, whose life has been forfeited through the misdeeds of his father, the King of Denmark. Charlemagne suspends his sentence, and takes him with him on an Italian campaign. In the midst of a panic Ogier seizes the Oriflamme, the banner of France, and leads the army on to victory, rescuing the emperor's young son, Charlot. One day the son of Ogier is killed by this young prince, in the castle at Laon, with a chess board, and the infuriate father turns upon Charlemagne himself. He is compelled to flee, and after a series of adventures he is captured by the knights of the warrior prelate Archbishop Turpin, and imprisoned at Rheims. Here he remains for seven years, when France is invaded by the Saracen giant Brehus, whom no French champion can withstand. Charlemagne implores the aid of Ogier, who mounts his famous steed Broiefort, rides against Brehus, and kills him, receiving from his grateful master the Duchy of Brabant as his reward. In later versions the story is spun out to 20,000 lines, and Morgue la Faye, the Argante or Morgan la Fée of the Arthurian cycle, together with other faeries, plays an important part in the adventures. Renaud de Montauban is an epic of above 17,300 Alexandrines, and was composed in the thirteenth century. Aymon, duke of Dordon (Dordogne), has four sons—Renaud, Guscard, Alard, and Richard, whom he brings to Paris to be knighted by Charlemagne. Renaud takes the oath of fidelity to the emperor for himself and for his brothers. Shortly afterwards their uncle, the Duke of Aigremont, falls under the displeasure of Charlemagne, and is killed by Ganelon. The four brothers demand justice on the murderer, but in vain. They consider themselves absolved from their oath, and aided by their cousin, the sorcerer Maugis, and their only steed, the enchanted Bayard, they hew their way through the French army and make their escape. After numerous marvellous adventures they enter the service of the King of Aquitaine, then at war with the Saracens, and the prowess of Renaud is rewarded with the hand of the king's daughter, the fair Clarissa. They then build the castle of Montauban, on the Dordogne, where they are afterwards besieged by Charlemagne. Again the help of Maugis and Bayard enables them to baffle the emperor, and a peace is concluded on condition that Renaud sets out for Palestine, and that Bayard is destroyed. The fairy steed escapes, but Renaud journeys to the holy city, from which he assists to drive the infidels. He then returns to Europe, disposes of his possessions among his children, and goes in quest of further adventures in the dress of a pilgrim. Arriving at Cologne, he offers his services to the architect of the famous cathedral. They are gladly accepted, but Renaud is killed by his suspicious fellow workmen, and his body thrown into the Rhine. It was, however, miraculously recovered, and the valiant knight afterwards canonized under the name of St. Regnault. Of the other romances connected with this cycle we can only give some of the names. Huon de Bordeaux (composed in the twelfth century), on which Wieland founded his Oberon, Beuves d'Hamtonnes (second half of the thirteenth century), our Bevis of Hampton, Macaire (thirteenth century), in which is found the story of the faithful hound avenging his master's death on the knightly assassin, Girar de Rossilho (Provençal, twelfth century, in French as Girard de Roussillon, fourteenth century), Garin de Monglane (fifteenth century), Aliscamps, and the therewith connected poems—Prise d'Orange, Covenans Vivian, Couronnement Looye, Charroi de Nîmes (thirteenth and fourteenth centuries), &c. A weak attempt to fuse all these various chansons into a regular epic was made by Philippe Mouskès or Mousket, of a knightly family

of Tournai. His *Chronique* ranges over the French legends and annals from the fall of Troy to the year 1243, about which year the work was completed. It is composed of nearly 81,300 eight syllable lines, about a third of which are devoted to Charlemagne. Another attempt, equally weak, was made by Girard d'Amiens at the request of Charles de Valois, brother of Philippe le Bel. The work is divided into three books, and contains 23,320 Alexandrines.

The Arthurian Cycle.—In the lays of the Welsh bards, supposed to be as old as the sixth and seventh centuries, although no MS extant is of earlier date than the twelfth century, Arthur and his companions are celebrated, but temperately, the element of the miraculous being absent. It is in the *Historia Britonum* of Abbot Nennius (apparently written in Welsh in the eighth century, and translated into Latin afterwards) that the legendary additions begin to develop. Of three or four centuries later date are the so called *Armorican Collections* of Walter, archdeacon of Oxford, from whom Geoffrey of Monmouth professes to translate, and in which the supernatural and marvellous elements largely prevail. The *History* of Geoffrey was versified in French (in 1155-58) by Wace, a native of Jersey, and a son of one of the Conqueror's followers. The *Brut*, as this metrical setting is called, contains about 15,300 eight syllable lines, and adds a few details to the story of Arthur which do not seem, however, to have been Wace's own invention. The work was translated into English, and further amplified, by Layamon, about 1204. The *Brut* of Layamon is composed of nearly 82,250 alliterative lines, or rather half lines. One of the most prolific of the Arthurian poets is Chrétien de Troyes (born about 1140). He could write flowing verses, and was a first rate story teller, but unfortunately his talents were employed in spreading the taste for fantastic adventure which has brought so much ridicule upon the Round Table. The subjects of his poems are so well known that we may only briefly mention them. They are *La Contes d'Eric* (or *Eric and Enide*), of which the *Eric* of Hartmann von Aue is a close imitation, *Le Contes de Ligeot*, *La Chevalier au Lyon*, which is the *Iwein* of Hartmann von Aue, and the *Yvain* and *Gawayn* edited by Ritson in his *Ancient English Metrical Romances* (1802), *Li Chevalier de la Charette*, which narrates Lancelot's pursuit of the unknown knight who carries off Guinever, *Perceval*, or *Li Contes del Graal*, the legend upon which is founded the *Parzival*, Wolfram von Eschenbach's masterpiece (see *GRAAL*). One of the finest of the early French Arthurian romances, *Tristan* or *Tristram*, was adapted by Gottfried of Strasburg, who left his *Tristan* and *Isolt* slightly incomplete, about 1210. Other poems belonging to the cycle are the *Morte Arthur*, a fine alliterative work of the fourteenth century, a Latin *Life of Merlin*, in 1529 hexameters, written about 1217, *Li Biaus Desconneus*, a narrative of the adventures of Gliglain, son of Gawayn, written by Renaud de Beaune about 1200, and imitated by Wirt von Gravenberg in his *Wigolais* (about 1212). From France the Arthurian romance spread also into Provence, Spain, Italy, and the Netherlands, and was again transplanted into England.

We come now to the last of the cycles, the *classical*, in which the subjects are Alexander the Great and the Trojan heroes. The materials for the Alexandrine poems were found in an old Greek romance, written in Alexandria between 100 and 300 A.D., and known as the *Pseudo-Callisthenes*, which was long read as authentic history, and of which there is still extant two Latin abridgments belonging to the ninth and tenth centuries. The most important romance on this subject is *Le Romans d'Alexandre*, written by

Lambert li Tors and Alixandre de Bernay in the twelfth century, it contains upwards of 20,800 twelve-syllable lines. This was the chanson that established the whole sub cycle, and that first brought the Alexandrine line into vogue and gave it its name. It concludes with the testament of Alexander and the lamentations of his twelve peers. Many French poets continued the subject, thus we have the *Vengeance d'Alixandre* of Jean le Nivelain, and the more remarkable *Vœux du Paon* by Jacques de Longuyon, a good Scotch version of which, preceded by the *Forray of Gadders* (one of the parts of the *Romans d'Alixandre*), appeared at Edinburgh in 1580. The *Vœux du Paon* furnished the first part of the quasi Arthurian romance of *Perceforest*. The English *Kyng Alisaunder*, in 8034 eight syllable lines, dates from the fourteenth century. It was a serious article of belief among the Romans that they were the descendants of one of the Trojan heroes, and it gradually became quite common for the natives of other countries to claim a similar lineage: thus the Franks derived their descent from a body of 120,000 Romans under a certain Francus, said to be a son of Hector, the Normans claimed Antenor as their ancestor, and the founder of the old race of British kings was asserted to be Brutus, Brut, or Brito, the great grandson of Aeneas. The most important poem belonging to this section is the *Troie* of Benoist de St More, an Anglo-Norman poet of the twelfth century. The chronicle contains upwards of 30,000 octo-syllables, is full of elaborate descriptions of palaces, paintings, and sculptures, of strange machines wrought by magicians, and of the wonders of natural history. One of the most remarkable episodes of the poem is supposed to be Benoist's own invention. This is the *Troilus and Briseida*, the last mentioned character being the *Griseida* of Boccaccio, and the *Cressida* of Chaucer and Shakespeare. The whole poem was translated into German verse by Herbert von Fritzlar (about 1200) and by Konrat von Wurtzburg (about 1240) and into Dutch verse by Jacob van Maerlant (about 1250). Founded upon it was a pompous Latin work, the *Historia Trojana*, by Guido de Colonna, which was translated into most of the European languages, and became the text book of the poets and prose romancers. It was turned into English and Scotch verse no fewer than four times. The most celebrated of these is Lydgate's *Troyc Boke* (1414-20). It expanded into the *Recueil des Histories de Troie*, composed by Raoul le Fèvre, chaplain to Duke Philip the Good of Burgundy. An English version of this work, known as the *Recueil*, was one of the books first printed by Caxton. See Wilhelm Grimm's *Deutsche Heldensage* (Berlin, 1867), Goedke's *Deutsche Dichtung im Mittelalter* (Dresden, 1871), Gaston Paris' *Histoire Poétique de Charlemagne* (Paris, 1865), Villmarque's *Contes Populaires des Anciens Bretons* (1842), Cox and Jones's *Popular Romances of the Middle Ages* (1871-72), Wagner's *Epics and Romances of the Middle Ages* (trans. 1882), Rhyss's *Studies in the Arthurian Legend* (1891).

ROMANCE (or ROMANIC) LANGUAGES. In the countries belonging to the Western Roman Empire, where Latin had been introduced, new dialects were formed during the time of the decline and fall of the empire from the mixture of Latin (not the classic Latin of literature, but a popular Roman language—the *Lingua Romana rustica*) with the languages of the barbarians by whom the countries had been overrun. These were called *Romani* or *romance* idioms. In all of them Latin was the basis and chief ingredient, and from them have sprung the languages now prevalent in the south of Europe—the Italian, French, Provençal, Walachian, Spanish, Portuguese, and the Rhetian,

or the language of the canton of the Grisons, called by the Germans *Cur-Walsch*, and by the people themselves *Rumonsch*. Raynourd believed in an original Romance language, which served as a common stock to the above dialects, but this opinion has not been generally accepted, and has been controverted by A. W. von Schlegel, and Sir G. Cornewall Lewis, in particular. See Lewis's *Essay on the Origin and Formation of the Romance Languages*.

ROMANESQUE ARCHITECTURE. See

ARCHITECTURE—Romanesque Style

ROMAN LAW. See **CIVIL LAW**

ROMAN LITERATURE. See **ROMAN**

ROMANO, GIULIO. See **GIULIO ROMANO**

ROMANS, a town of France, in the department of Drôme, 10 miles north east of Valence, picturesquely situated on the right bank of the Isère, the handsome bridge over which communicates with the town of Pâgé. It has walls flanked with towers, but no edifices of note except a church and a theatre. Its manufactures are silks, hosiery, woollens, and leather, and the trade is in wool hemp, silk, wine, olive oil, and skins. Pop. (1896) 13,165.

ROMANS, EPISTLE TO THE, the most elaborate, and, in a doctrinal point of view, the most important composition of St Paul. That it is a genuine work of the apostle of the Gentiles has never been seriously doubted by competent scholars, but its integrity has not been so unanimously admitted. With the exception of Marcion's authorities who probably tampered with the MSS of the Epistles as he did with those of the Gospels, and who considered the last two chapters spurious, all the MSS and versions contain the epistle as we have it, it is in modern times that doubts have been thrown upon the authenticity of the concluding portion. By Heumann it was considered to have originally ended with chap xi, chaps xii-xv being a distinct production, though likewise addressed to the Romans and chap xvi a sort of postscript to the two. Semler confined his doubts to chaps xv and xvi, the former of which he regarded as a private encyclical for the use of the brethren whom the bearers of the larger epistle should meet on their way to Rome, the latter as a catalogue of persons to be saluted on the journey. Schulz supposed that chap xvi was addressed to the Ephesians from Rome, Schott that it is made up of fragments from a short epistle written by Paul when at Corinth to an Asiatic church, and Baur has more recently followed upon the same side, but, as usual, on merely internal grounds, and in favour of his theory of the relation of the parties of Peter and Paul in the apostolic age. These hypotheses have now been generally abandoned, and by all recent critics of note the two last chapters have been restored to their place as an integral part of the Epistle. It was written during the second abode of the apostle at Corinth, where he stayed about three months, after having made a journey in Macedonia and Achaia. It was despatched by Phoebe, a woman of Cenchrea, to the port of Corinth. Most of the commentators are of opinion that it was written in the year 58. As to its contents, the Epistle consists of two divisions, the former (chaps. i-xi) comprising the doctrinal, the latter (chaps. xii-xvi) the practical portions. After an introduction (chap. i 1-16), in which the apostle expresses his desire to see the Romans, he sets forth the gospel plan of salvation. The gospel is a power unto salvation to every one who believes, both Jew and Gentile, it is needed by all, for none, not even the Jew by his law, nor the Gentile with the law of nature written on his heart, can be justified before God. It is only faith in Christ which works justification, even as Abraham and David were justified by faith. Those

who are justified have peace with God and rejoice, for through the Reconciler a new life has begun for mankind. But with reconciliation holiness must be connected not under law but under grace. The spirit of life in Christ overcomes sin and the flesh and all earthly sufferings through hope, the believer already lives here below in security. The writer then deplors the rejection of the Jews, but consoles himself with being assured that it will not be final. In the practical part the apostle admonishes the Romans to exercise the various gifts bestowed upon each in a spirit of love and humility, and in such a place as the capital of the empire to set an example to the constituted authorities. He especially urges the strong to bear with the weak, and concludes with various salutations and directions. The style of the Epistle is throughout that of St Paul—dialectic, but not after the Aristotelian method, parenthetical full of energy and fire. Among modern commentaries are Jowett's (1856) Weiss's (8th ed., 1891), Godet's (Eng. trans., 1883) Lipsius's (2nd ed., 1892), Luthardt's (2nd ed., 1894) and Sanday and Headlam's (1895). See also arts in the various dictionaries of the Bible.

ROMANTIC, in æsthetics, is used as contradistinguished to *antique* or *classic*. (See these two articles.) Christianity turned men's thoughts from the external world, and the present condition of man, which had engrossed the attention of antiquity, to his spiritual nature and future destiny and all the works of imagination soon testified of the change. An unbounded world of imaginary beings, good and bad, beautiful and deformed, human, animal, angelic and demonic, was created. The effect was increased by the mixture of the northern element with that of the south, for the northern mythology was full of supernatural, shadowy beings. A further consequence of Christianity was the giving of increased importance to the individual. The love and hatred, success and sufferings of individual men assumed a more prominent place than had been allowed them in antiquity, the sense of personal dignity was heightened, and the longing for something better than the present world can afford became more intense. These circumstances furnished the chief elements of romantic poetry—the poetry of the middle ages. The Greek lived in what is and was, the Christian in what is to come. So much is the spirit of romantic poetry connected with Christianity that Jean Paul says in his *Vorrede zur Ästhetik*, 'The origin and character of the whole modern poetry is so easily to be derived from Christianity that the romantic might be called with equal propriety the *Christian poetry*'. And so much is romantic poetry impressed with the longing for something beyond the existing world that Viennet in his *Épître aux Muses sur les Romantiques* (Paris, 1824) says,

'C'est la mélancolie et la mysticité,
C'est l'affectation de la naïveté,
C'est un monde idéal qu'on voit dans les nuages
Tout, jusqu'au sentiment, n'y parle qu'en images
C'est un je ne sais quoi dont on est transporté
Et moins on le comprend plus on est enchanté.'

'The melancholy and mystery
The affectation of sage quaintness—
An ideal world seen in the clouds,
Where thought itself is clothed in imagery—
It is an indescribable ecstasy
The less understood the more enchanting.'

Romantic poetry first grew up in the south of Europe, as its name would naturally lead us to suppose (see *PROVENÇAL POETS* and *ROMANCE LANGUAGES*), and was imbued with the spirit of chivalry, which also had its origin there. Hence the reason why love holds so prominent a place in romantic poetry. The reader will find some remarks applicable to this subject in the article *CHIVALRY*, where we

have attempted to trace the causes of this singular institution. The age of chivalry has passed, the chivalrous spirit has taken a different direction, but the causes which produced the romantic poetry are by no means all extinct, and the poetry of our time has much more resemblance to that of the middle ages than to the Greek. The same circumstances which gave its character to the poetry of the middle ages had a corresponding influence on the fine arts in general, and music, painting, and architecture were imbued with a peculiar spirit. The magnificent Gothic cathedrals which still remain bear witness to the aspirations which Christianity awakened and the solemnity which it inspired. The term *romantic*, therefore, is frequently applied to modern art in general, in contradistinction to the antique *classic* or *plastic*.

ROME—*History*.—Ancient Rome was situated mainly on the left bank of the Tiber (in the earliest times called *Rumon* and *Albula*, as well as *Thybris* and *Tyberis*), about 15 miles from its mouth, on the northern boundary of Latium, near the meeting place of Latium Etruria, and the country of the Sabines. The inhabitants of all these three countries were closely connected at an early date, but the Latins, or people of Latium, and the Sabines were allied to one another in speech, while the Etruscans spoke a language of unknown affinities. The former two are indeed regarded as forming one stock to which Mommsen has given the name of Itilians in a restricted sense, and they were by the ancient Greeks designated by one name, *Osci*, an other form of *Osci*, which was, properly, the name only of the southern section of the stock, that with which the Greeks first came into contact. It was to people of this stock that in the opinion of all historians the city of Rome owed its origin.

The date and precise circumstances of the foundation of Rome are beyond the reach of history. Trustworthy Roman chronology begins with the taking of the city by the Gauls in 390 B.C., or at a period not long before that, from which the pontifex maximus or chief priest regularly kept yearly chronicles (*fasti*) in which the years were distinguished by the names of the chief magistrates. These chronicles reach as far back as 509 B.C., the date of the commencement of the republic, but those belonging to the earlier years seem to have been supplied by later hands, and although their compilers may have had more or less authentic materials enabling them to do so, yet these earlier chronicles have not for us the same authority as those subsequent to the year 390 B.C. The chronology previous to the establishment of the republic is altogether destitute of authority, and seems to have been devised by the pontiffs in a somewhat mechanical manner. They appear to have been able to trace back the history of the republic for 120 years before the Gallic irruption, and then to have reckoned about double that period to the foundation of the city, which was adopted as the Roman era (A.U.C.). The first year of the era of Varro, which is that most commonly followed, corresponds with the year 753 B.C.

All that can be accepted as the history of Rome previous to the republic is merely what can be collected from a large body of tradition and legend, which passed among ancient and even among modern historians down to a comparatively recent date as genuine history. These traditions are often conflicting, and this is naturally more especially the case with the earliest traditions. Of the foundation of Rome there are no less than twenty five different accounts, many of which are, however, merely variations of the same. The main differences between these accounts refer to the time of the foundation,

some assigning it to a period before the fall of Troy, others to a period a little after that event, and others again representing the city to have been founded by Romulus, grandson of Numitor, king of Alba Longa, several centuries after the Trojan war. In the most widely diffused of the first set of traditions the foundation of the city is ascribed to the Arcadian Evander, who is said to have formed a settlement on the Palatine Hill about sixty years before the fall of Troy, and the tradition of such a settlement having been made was very generally current even among those who believed that the foundation of Rome did not take place till a later date. In the second set of traditions, Æneas, or one of his descendants, is most generally named as the founder of Rome, but sometimes others have the honour assigned them, for example, a son of Ulysses and Circe. Such traditions were chiefly current among the Greeks. The tradition that Romulus was the founder was the favourite one among the Romans, and was that accepted by those who fixed the Roman era. For the details of this tradition see ROMULUS.

The site on which Romulus is said to have founded his city was the Palatine Mount, and the likelihood is that the nucleus of the city was actually formed here. The other hills that were afterwards embraced within the circuit of the city, that is, within the limits of the wall ascribed to Servius Tullius, and that obtained for it the epithet of the city of Seven Hills, were the Saturnian, afterwards called Capitoline Hill, to the north west of the Palatine, and the Aventine to the south west, the Quirinal, Viminal and Esquiline Hills on the north east of the city, and lying in a direction from north west to south-east, and the Cilian Hill on the south east of the city. The height of these eminences scarcely entitles them to the name of hills, for the highest, the Esquiline, rises only 154 feet above the level of the Mediterranean. On the right bank of the Tiber due west of the Palatine was another hill called the Janiculum, higher than any of those mentioned, but this, though in course of time included within the boundaries of the city, was never regarded as one of the seven hills. From the first the city is said to have been inclosed by a sacred belt of land called the *pomerium*, which no one was allowed to build on or to apply to any common use. This was extended as the city grew, but only a conqueror who had added to the Roman territory had the right to make such an extension.

The same tradition that ascribes to Romulus the foundation of Rome makes him the first of seven kings who ruled over the city till the tyrannical behaviour of the last of them led to the overthrow of the monarchical and the institution of a republican form of government at the date already mentioned, 509 B.C. The weight of tradition places it beyond all doubt that in the earliest period the government of Rome was really monarchical, and the nature of the traditions respecting Rome itself, as well as other Latin cities, makes it probable that the monarchy was elective. Beyond this little can be said. The supposition that there were only seven kings from the foundation of the city to the overthrow is altogether untenable, and of the kings whose names have been rescued by tradition, the earlier ones are rejected as entirely mythical, and with regard to the others it cannot be ascertained how much is history and how much fable. It is necessary, however, to give the names of these kings, not only on account of the interest attaching to the legends and traditions respecting them, but because it is convenient to connect with their names all that is considered as authentic in the history of Rome during the kingly period.

The first king of Rome then was Romulus. The people over whom he originally ruled were called Ramnes (Romans), but to these other two tribes the Tities and the Luceres are said to have been afterwards added. These three tribes constituted the whole of what was known as the people (*populus*) or patricians, the sole politically privileged class. That the Roman people did ultimately consist of three tribes is certain, and it appears to be almost equally certain that these tribes had a different national origin. It is generally agreed that the Ramnes were Latins, and the Tities Sabines. With respect to the Luceres there is more diversity of opinion, some holding them to be Latins, and others Etruscans. The first two appear to have been formed into one body long before the last was incorporated. The probability seems to be that for a long time there existed side by side two independent communities, the one the Ramnes, on the Palatine, and the other the Tities on the Quirinal and Viminal Hills, and that ultimately these two united. The name of the city on the Quirinal and Viminal Hills was Quirium (possibly connected with the Sabine town of Cures), and after the union the two peoples jointly bore the name of Quirites as well as that of Romans. From a very early period there were in Rome besides the people properly so called, a class of inhabitants called clients, to whom the members of the privileged class stood in the relation of patrons. These were probably strangers, who had either come into the city of their own accord, or had been brought in by conquest. They were allowed to attach themselves to particular patrons, and were enrolled as belonging to their patron's family. From their patron they obtained protection, in return for which they were expected to render him certain services the nature of which was not strictly defined.

The reign of Romulus, which is traditionally described as one of war and conquest, was followed by that of Numa Pompilius, which was of an opposite character. The wars by which Rome at an early age seems to have extended its sway over the other towns of Latium are assigned by tradition to the reigns of the next two kings Tullus Hostilius and Ancus Marcius. The subjection and subsequent destruction of Alba Longa, which forms the subject of the legend of the Horatii and Curiatii (see HORATIUS) is said to have taken place under the former king. To Ancus Marcius is ascribed the origin of the plebeian order, which consisted of citizens of conquered states, who were brought to Rome and allowed to live there in complete freedom, but without the enjoyment of political privileges. By almost all historians and scholars they are regarded as distinct from the clients, not being, like them, bound to particular patrons. Nor were they plebeians in the modern sense of the term, that is, members of the lower classes, for they included among themselves all ranks of society, and even had a nobility of their own. The plebeians generally enjoyed the favour of the kings, who supported them as a counterpoise to the power of the patricians.

The last three kings of Rome are all said to have been of Etruscan origin. The great sewer (*Cloaca maxima*) that drained the marshy hollows between the Palatine and the Tiber, a work entirely Etruscan in character, is said to date from the reign of the first of these, Tarquinius Priscus, who is also said to have adorned the city with other great works. To Servius Tullius are ascribed two changes in the constitution of great importance in the subsequent history of Rome. Previous to this all political power was in the hands of the patricians. All matters of importance had to be laid before them in their *comitia curiata* or assembly of *curiæ*. (See PATRICIANS

and COMITIA.) From and by them also were elected the members of the senate, or council of the elders, as it may be called, which advised the king (See SENATE.) By the reforms of Servius Tullius the way was at least prepared for altering this state of affairs. He in the first place divided the inhabitants of the town and the country round belonging to Rome into thirty tribes, four of which were town and the remainder country tribes. It is uncertain whether both patricians and plebeians were included in this new division into tribes, or merely the latter, but the plebeians had at any rate the majority. Each tribe had its own magistrate. The object of this division was originally only to provide for the local government of the tribal districts, but it became in the end the means by which the plebeians secured for themselves the supreme power in the state. The next reform of Servius Tullius was the division of all the people, patricians as well as plebeians, according to their property, into five classes, and these again into centuries. The class to which a person belonged determined the amount of his taxation. With the first or highest class was sometimes reckoned a body called *equites* or horsemen, but these were sometimes regarded as above all the classes. The lowest section of the people, called *proletarii*, as serving the state merely with their children, or *capite censi*, because they were numbered by the head, and not according to their property, of which they possessed little or none, were sometimes reckoned as a sixth class, and sometimes as forming part of the fifth. The division into centuries was not made according to numbers, but according to wealth, so that the first class, although necessarily the smallest, contained (including the *equites*) more than half the whole number of centuries, 100 out of 193 or 194, while the *proletarii*, although necessarily the largest class, formed only one century. To the assembly of centuries thus established (*comitia centuriata*) were transferred the highest functions of the *comitia curiata*, with the reservation, however, that the decisions of the former assembly were to be subject to the approval of the latter, and as in the larger assembly each century had one vote, it is evident that the result of the arrangement above indicated was to assign to the wealthiest part of the community at once the greatest burdens in support of the state and the chief political power. A further provision was made for giving superior influence to age. This consisted in dividing all the centuries of each class into seniors (those above forty-five) and juniors (between seventeen and forty five inclusive), one half belonging to each designation. See CENSUS, CENTURY, COMITIA, and EQUESTRIAN ORDER.

It is manifest that this constitution ascribed to Servius Tullius (and which certainly was of early date, whoever was the author of it) was by no means a democratic one, but it offended the patricians because it gave to the plebeians equal power with the patricians in proportion to their wealth. On this account, it is said, they hated the king who had drawn it up, and encouraged his son in law L. Tarquinius, the son of Tarquinius Priscus, to murder him and take possession of the throne. This second Tarquinius, who earned for himself the surname of Superbus (the Proud), was the last king of Rome. He is said to have extended the limits of the state by successful wars against the Latins, but his tyrannical government excited the hatred of all classes, and this was raised to the highest pitch by an act of violence perpetrated by his youngest son Sextus (See LUCRETIA.) The people then rose in rebellion, and deposed and banished the king, who was then absent on a warlike expedition, and on his return found the gates closed against him. At the same

time they abolished for ever the kingly government. The precise date given to this event in the pontifical chronology is the 24th of February, 509, and annually on that day a festival called *Regifugium* or *Fugalia*, was afterwards celebrated at Rome in commemoration of the event. The details of the expulsion of the kings are, of course, entirely untrustworthy, but the main facts, that the later kings had rendered themselves obnoxious to the people, and that the monarchy was ultimately overthrown by violence, seem to be sufficiently attested by the fanatical hatred and fear that the Romans ever after entertained even of the name of king. The only case in which the name was retained by them was as the title of the person to whom the priestly functions of the kings were transferred. When the other powers of the kings were given to magistrates bearing other names, a *rex sacrorum* (sacificial king) was retained, 'that the gods might not want a mediator'.

The abolition of the monarchy, although apparently the work of all sections of the people, was prejudicial to the interests of the larger fraction of them, the plebeians. It has been already mentioned that the kings seem to have extended their protection to this class, in order to secure their support against the patricians, and now when a republic was established it was essentially a patrician republic. It is true that the constitution of Servius Tullius, in which both elements of the population were recognized, was made the basis of the new order of things. Legislation and the right of electing magistrates were intrusted to the *comitia centuriata*, but the senate, which, in spite of the addition of a large number of the wealthiest plebeians that was now made to its numbers, still remained patrician in feeling, had now the chief power, and acquired the right of initiating all measures that were to be laid before the people. None but patricians could be elected magistrates (the chief of whom, at first the only ones, were the two consuls, originally called *prætors*, elected annually). The internal history of Rome for more than 200 years is mainly composed of the endeavours of the plebeians to place themselves on an equality with the patricians, and so severe were the struggles resulting from these endeavours that for about three fourths of that period (till after the middle of the fourth century B.C.) the Romans had little leisure for external affairs.

One interesting and authentic monument of the external history of Rome, in the shape of a treaty with Carthage engraven on brass, belonging to the first year of the republic, was preserved long enough to enable the historian Polybius to record the most important of its provisions. In this treaty Rome was recognized as the head of Latium, and as possessing the Italian coast as far as the Bay of Terracina, and the Carthaginians bound themselves to make no trading settlements on the coasts of Latium and Campania, while the Romans for their part engaged not to sail south of the Hernian promontory (now Cape Bon). The only other important fact in the external history of Rome under the early republic was the conquest of the city by the Etruscans, an event which appears to be disguised in the legend of Porsenna, and which seems actually to have taken place within the first fifteen years after the republic had been erected. Tradition makes mention also of a war with the confederacy of the Latins about the same time, and in this war is said to have occurred the first instance of the appointment of a dictator, an extraordinary magistrate to whom was intrusted on great emergencies unlimited power, both in the city and in the field, for a term of six months, or until the emergency should have passed.

As long as these wars lasted the patricians, who

had need of the plebeians to act as soldiers, appear to have treated that class with some consideration, but their acts of oppression are said to have begun as soon as the wars were over. Although many of the plebeians might be rich the majority of them were poor, and yet they were not only required to serve in the army without pay, but also to furnish their own equipment. In addition to this, while they were absent with the army their fields were ill tended, and poor harvests and impoverishment ensued. To escape from their immediate distress they indebted themselves to the richer patricians, and when they were unable to pay, the laws of debt placed them at the mercy of their creditors, who might sell them as slaves, or if they pleased put them to death. When they could no longer endure the miseries of their condition they are said on one occasion (B.C. 494) to have marched in a body to the Sacred Mount, a few miles from Rome, threatening to found on that site a city for themselves. It was only with difficulty that they were induced to return, and the patricians were obliged not only to concede certain temporary measures for their relief, but to agree to the annual election of two magistrates to be called tribunes of the plebs (*tribuni plebis*), who were to have extensive powers for the protection of that order. Their chief prerogative consisted in the right of interfering by a veto to prevent the execution of any command issued by a magistrate affecting a citizen. There was an appeal from their decision, but it was to the *comitia tributa*, in which the plebs was predominant. Their number was afterwards increased to five, and finally to ten.

The next contest between plebeians and patricians related to what was called the public land (*ager publicus*). As this subject is fully treated in our article AGRARIAN LAWS it is unnecessary again to go into the details of it. It is enough to state here that this public land was land taken by the state from the neighbouring conquered tribes, and that at every addition to the public land a portion of it ought to have been distributed among the plebeians, as the absolute property of the individual allottees. The patricians, however, constantly evaded the carrying out of this arrangement, and hence arose repeated complaints and demands for justice on the part of the plebeians, complaints and demands which were renewed during almost the whole history of the republic. The first to attempt to obtain for them justice in this matter was Spurius Cassius in 486, and he fell a martyr to the cause.

Another grievance of the plebs was that the administration of justice was exclusively in the hands of the patricians, who gave their decisions according to traditional law and precedent, which was too favourable to partiality and caprice. To remedy this evil the plebeians demanded written laws, and after years of hot contests the tribunes carried a motion for the appointment of a commission to visit Greece and make themselves acquainted with the laws in force there, especially those of Solon at Athens. After their return it was agreed by both parties that in place of the regular magistrates, ten men (*decemviri*) should be nominated, with unlimited power to govern the state and prepare a code of written laws. These men entered on office in 461 B.C., and at first discharged their duties to the contentment of all, and at the close of the year their laws met with such approval in the popular assembly that they were continued in office a second year in order to complete their task. In the first year of office the decemviri had compiled ten tables of laws, and to these in the second year they added other two tables, making up the famous Laws of the Twelve Tables. But when the second year had elapsed, and the object for which

they had been appointed was accomplished, they refused to lay down their office, and were only forced to do so by an insurrection. The immediate occasion of this rising was, according to the well known story made popular by Macaulay in his lay of Virginia, an act of infamy attempted by one of the ten. See APPIUS CLAUDIUS.

After the overthrow of the decemvirate the old magistrates were reappointed, but the title of the two supreme magistrates was now changed from praetors to consuls (449 B.C.). The events of the first year of the return to the old institutions show that the movement by which this had been brought about was a plebeian victory, for the powers of the plebeians were then greatly extended, first by the number of the tribunes being increased to ten, and secondly by the passing of the three Valerian and Horatian laws (so called from the consuls who passed them), the first of which enacted that the resolutions of the plebs (*plebisca*) passed in the *comitia tributa* should have the force of laws, after being confirmed by the senate and the other two *comitia*. This enactment was the foundation of the great power that the plebeians ultimately acquired, for although the necessity of the sanctions mentioned was at first a serious drawback, yet in process of time the granting of these sanctions came to be a mere formality. This victory of the plebs was rapidly followed up by others. In 445 they obtained the *connubium*, or right of intermarriage with the patricians, without loss of rank to the offspring of such marriages. At the same time they demanded admission to the consulate, but this the patricians persistently refused, chiefly on the ground that it would be a desecration for a plebeian to perform the religious ceremonies which were connected with the consular office. In the end a compromise was made. The office, or at least the title of consul, was abolished, and in its place was adopted that of military tribune, the title belonging to a rank in the army to which plebeians as well as patricians might rise. It was determined that instead of the two consuls there should be elected annually a number of military tribunes with consular power, and that both classes of the community should be eligible to the office. It is supposed that six is the number of these magistrates that it was intended to elect, since that was the number of tribunes in a legion, but, in fact, the number varied at the different periods at which they were elected: sometimes there were three, sometimes four, sometimes six, and once eight. The first military tribunes took office in 444 B.C. Although eligible to this office, it was not till the year 400 B.C. that a plebeian was actually elected. At times also the consulship was revived, until at last the plebeians were admitted to this dignity also, when it was made permanent, and the military tribunate abolished, after an existence of about eighty years. While in the establishment of the military tribunate the patricians, at least nominally, placed within reach of the plebeians most of the consular powers, they managed, by the institution of another office, still to reserve for themselves one important part of those powers. It had been one of the duties of the consuls to keep registers of the senators as well as of the members of the equestrian order, and other citizens, according to their property (*census*), and in doing so it was in their power to exclude from the senate persons otherwise entitled to admission to that council by merely passing over their names in the register. This duty was now transferred to two new officers called censors. The office was created in 443 B.C., and was confined to patricians.

A break here occurs in the civil history of Rome, which makes it convenient to throw a glance back on the external relations of the city during the pre-

vious fifty years. On this subject it may be remarked in general that while the internal conflicts lasted the power of Rome rather receded than advanced, and down to the point that we have now reached their wars were mainly defensive. This would be all that it is necessary to state were it not that with some of these wars are connected legends and traditions so celebrated that the most rapid sketch of Roman history cannot omit to mention at least their position. Such are the war with the Volsci, of which Coriolanus was the hero (491 B.C.), that with Veii, which led to the almost complete extermination of the Fabii (477 B.C.), and that with the Aequians, in which the Roman army was saved by the dictator Cincinnatus (458 B.C.) See CORIOLANUS, FABIUS, and CINCINNATUS.

Towards the end of the fifth century B.C. the wars of the Romans became more aggressive in their character. The troops were now paid, and could therefore be kept longer in the field. After extending her territory to the south Rome turned her arms against Etruria in the north. For ten years (405-396) the important city of Veii is said to have been besieged, till in the latter year it was taken by Camillus, and the capture of this city was followed by the submission of all the other towns in the south of Etruria. But just at this point Rome was thrown back again by that disastrous event which has already been mentioned as marking the commencement of trustworthy Roman chronology, the capture and destruction of the city by the Gauls in 390 B.C. These barbarians had descended from the banks of the Po, and after having wasted Etruria met the Roman army on a small stream called the Allia, about 11 miles from the city, where they inflicted on it so terrible a defeat that very few of the Romans are said to have escaped from the field. The day on which this event happened was the 15th of July, and was ever after marked as a black day in the Roman calendar. After their victory the Gauls entered the deserted city of Rome, and burned it to the ground. Only the Capitol or citadel on the Capitoline Hill was saved. Here all those capable of bearing arms are said to have taken refuge, and to have endured, under Marcus Manlius, hence called Capitolineus, a siege of seven months, after which the Gauls retired with their booty. See BURNUS.

Rome had scarcely been rebuilt after this overthrow when the patricians renewed all their former claims to supremacy, and revived the laws of debt with all their severity as a means of oppressing the plebeians, whom the depredations of the Gauls had again impoverished. Marcus Manlius, the defender of the Capitol, took up the cause of this persecuted class, but only succeeded in drawing upon himself the hatred of the patricians, who, under the groundless pretext that he was aiming at the royal power, got him condemned to death, and thrown down from a precipice on the Capitoline Hill called the Tarpeian Rock (384 B.C.). But this act of cruelty and ingratitude roused the plebeians to greater efforts. In 376 B.C. two courageous and able tribunes of the plebs, Lucius Stolo and Lucius Sextus introduced the three following measures: 1 That consuls should be again elected, but that one of them should always be a plebeian, 2 That no citizen (patrician) should hold from the state more than 500 jugera (a jugerum was about 6ths of an acre) of the public land, and that the remainder should be assigned in small allotments to the plebeians as their absolute property (see AGRARIAN LAWS), and 3 That from the principal of a debt the sums already paid in interest should be deducted, and the remainder of the debt paid in three annual instalments. These proposals were resisted by the patricians with all their

might for ten years, but all their endeavours were thwarted by the resolution of the tribunes, and the proposals finally became law in 366 B.C. This event virtually put an end to the exclusive privileges of the patricians. The priestly offices, the newly created dignity of praetor for the administration of justice, and some other posts, did indeed still remain in their exclusive possession, but in the course of a few decades the plebeians were admitted to these also. They were longest shut out from the sacred colleges of the pontiffs and augurs, which were only thrown open to them in 300 B.C. by the Ogulnian Law. See PLEBEIANS.

Long before this the Romans had entered on that career of war and conquest which was pursued by them almost without interruption down to the period of their decline. The inundation of the Gauls, which had temporarily overwhelmed them, had rendered them a service by breaking the power of one of their most formidable neighbours. The Etruscans, though still independent, as they continued to be for many years after that event, were no longer a source of danger. The Gauls themselves, great hordes of whom roamed at intervals over Central Italy, were the chief people with whom the Romans had to contend for many years after the great invasion, but the chance conflicts in which they were involved with those enemies are only important as having given celebrity to a few individual heroes (Titus Manlius Torquatus, M. Valerius Corvus), and as having marked out the Romans to the other inhabitants of Italy as their chief bulwark against the Gallic invasions, a circumstance which in all probability contributed not a little to the consolidation of Rome's power. Being safe on the side of Etruria on the north, and supreme over the tribes of Latium immediately to the south, the Romans in 343 B.C., according to an appeal for aid made by the inhabitants of Capua in Campania, who offered to place themselves entirely under their protection and sway, turned their arms against the warlike and freedom-loving Samnites inhabiting the slopes of the Apennines to the south of the Sabine territory and south-east of Latium. In this war they were victorious, but a revolt of the confederate Latins, who no longer wished to acknowledge Rome as their head, prevented them from pursuing their victories on this occasion. Hastily concluding peace with the Samnites (341 B.C.) they advanced against their new enemies, whom they met at Vesuvius, where a single battle rendered memorable by the self-sacrificing heroism of Decius Mus, decided the victory in favour of the Romans. The Latins, belonging to the northern part of what was afterwards included under the name of Latium, were thereupon reduced to the condition of allies (*socii*), as were also soon after their neighbours to the south, the Volsci, Aequi, and Hernici. As such they were compelled to serve in the Roman armies, but were allowed to govern themselves. The bronze beaks (*rostra*) of the ships captured in 338 B.C. in the Volscian town of Antium adorned from that time the orators' platform in the Roman forum.

In 326 B.C. some frontier disputes led to a renewal of the war with the Samnites. In the first campaign the Romans were successful, but in 321 B.C. the imprudent advance of the consuls Veturius and Posthumus brought the Roman army into so desperate a situation in the Samnite passes called the Caudine Forks, that it was compelled to lay down its arms, and surrender to the Samnite general Pontius. The consuls in their distress concluded a peace with the Samnites, but this peace was repudiated by the Roman senate, who delivered up to the enemy those who had agreed to it. The Samnites, however, magnanimously refused to receive them, and the war

was renewed, and carried on so greatly to the disadvantage of the Samnites that they were obliged to seek allies. But Rome's energy increased with the number of her enemies, and these new Samnite allies (Etruscans and Sabine tribes) were speedily subjected or compelled to accept separate treaties (310-305). In 304 the Samnites themselves were glad to agree to a peace, but it was only of short duration. Six years later (294) the third Samnite war commenced. On this occasion the Samnites were joined by Umbrians, Senonian Gauls, and Etruscans, and in order to be better able to co-operate with their allies they moved into Umbria, which lies to the north of the Sabine territory, and east of Etruria. Their success was now, however, no better than it had been formerly. In the present war, celebrated for the battle of Sentinum (295), in which the younger Decius Mus imitated the example of his father, and for the victory of Curius Dentatus over the 'sacred host' of the Samnites, they were completely subdued, and in 290 B.C. were reduced with their allies to the necessity of acknowledging the supremacy of Rome, and accepting the condition of Roman *socii*. The victors secured their conquests by numerous military colonies, but treated the conquered tribes with wise moderation.

The events of this war involved the now powerful city in another, which led to new conquests. The Greek colony of Tarentum, in the south of Italy, had behaved during the war in such a way as to offend the Romans. For this the latter sought reparation, and when their demand was refused declared war. The effeminate and cowardly Tarentines called in the aid of Pyrrhus, the adventurous king of Epirus, who defeated the Romans in two battles (280, 279), in which, however, he himself suffered so severely that he is said to have exclaimed, 'One more such victory and I shall be ruined'. After an interval of four years, during which Pyrrhus had been absent in Sicily, his forces and those of the Romans again encountered, and now the Roman general Curius Dentatus inflicted upon him so signal a defeat that he was glad to withdraw with all convenient speed from Italy (275). The scene of this battle was Maleventum (Ill come) in Samnium, henceforth called Beneventum (Well come). Three years later (272) Tarentum was taken, and its capture was followed by the subjugation of all Lower Italy, the inhabitants of which were partly reduced to the condition of allies and partly to that of subjects. Rome was now the undisputed head of Italy. Her fame had already extended to the East, so that the Egyptian king Ptolemy Philadelphus sent a splendid embassy to seek her alliance.

The next war of Rome can be attributed only to the lust of conquest that her previous successes had engendered. It was waged with the Carthaginians, the most dangerous enemy that Rome had to encounter in the whole of her upward career. Carthage was an important maritime city in the north of Africa, and had established various colonies in the Mediterranean, especially in Sardinia (the whole of which they possessed) and Sicily, where they had formidable rivals in the Greeks. The latter was the place in which Carthage came into hostility with Rome. Hitherto the relations between these two powers had been on the whole amicable. Besides the treaty already mentioned as having been concluded between them in the first year of the republic, two others had subsequently been entered into, the one in 348 B.C. and the other in 308 B.C. in both of which Rome, at the expense of acknowledging the dominion of Carthage throughout the Mediterranean Sea (which was undisputed), obtained protection for her commerce against the Greek pirates. But Rome having had

leisure to conquer Italy, now felt at liberty to contend for the possession of Sicily, even though this was certain to involve them in a war with the great maritime power of Carthage. The opportunity for gaining a footing in this island was furnished by a body of Campanian mercenaries calling themselves Mamertines, who, having been discharged from the service of the Greek colony of Syracuse, had on their way home made themselves master of the town of Messana in the north east (about 284 B.C.), and since then had kept the whole island in alarm by their predatory incursions. At last they were defeated in 270 B.C. by the Greeks under Hiero, and besieged by them for five years in the city they had seized. In their distress they appealed to Rome for aid, which, in spite of the opposition made by the more honourable citizens in the senate, was granted when the question was referred by the consuls to the *comitia centuriata*. The Carthaginians, who had at first given an equivocal support to the Mamertines, and by this means had secured the possession of the citadel of Messana, now formed an alliance with Hiero (since his victory over the Mamertines king of Syracuse). In 264 B.C. the war began. In that year the Romans crossed the straits separating Italy from Sicily, and in the following year, having gained a great victory over the combined Carthaginians and Syracusans, got rid of one of their enemies by a separate peace, in which Hiero formed an alliance with the Romans, and was in recompense allowed to retain possession of all the south east of Sicily. By the end of the third campaign (262 B.C.) the Romans had made themselves masters of all the rest of the island except one or two fortresses in the north west. But while they were thus successful on land, their commerce was harassed and their allies laid under tribute by the Carthaginian fleets. The Romans were thus led to see that it was impossible finally to conquer the Carthaginians unless they could outmatch them at sea, and accordingly, although they were not themselves a naval power, at once set about building a large fleet, taking as their model a Carthaginian quinquereme that had been stranded on the coast of Italy. With such energy did they go to work that by the spring of 260 B.C. a large fleet was ready, and in the same year the consul Duilius gained for the Romans their first naval victory in a battle which took place off Mylae, on the north-east coast of Sicily. This gave the Romans courage to carry the war into Africa. With this object they equipped a fleet to transport a large land army to the enemy's territory. Under the command of Regulus this army gradually advanced conquering and devastating to the gates of Carthage, which now sued for peace. The Romans agreed to negotiate for this object, but the terms they offered were so hard that the Carthaginians determined to resist to the end rather than accept them, and made the most strenuous exertions to carry on the war with success. They increased the number of their mercenaries, and gave the command of their whole forces to an experienced Spartan general named Xanthippus. In 255 B.C. a battle took place near Tunis, in which the Roman army was completely defeated, only about 2000 succeeding in making their escape from the field of battle. Regulus himself was among the prisoners. This defeat was followed by a series of further disasters. Two Roman fleets were destroyed by storms, so that the Romans for some years renounced naval warfare, and on land too, in Sicily, they lost ground. Between 252 and 250, however, the Romans retrieved most of their losses on land, and the Carthaginians now thought that a favourable moment had come for treating of peace. But their proposals were again rejected (see REGULUS), and

the war went on for nine years longer. In 249 B.C. the consul Appius Claudius was defeated at Drepanum both by land and by sea, and further successes were gained by the Carthaginians after the able General Hamilcar Barca had, in 247 B.C. (the very year of the birth of his still greater son Hannibal), been appointed to the command of their forces in Sicily. He took Eryx, a strong place near the west coast of Sicily, and from this point watched and checked all the movements of the Romans. But this was possible only as long as he could be supplied with all necessaries from the neighbouring port of Drepanum. When, therefore, in consequence of a magnificent outburst of patriotism, Rome had been provided by private contributions and appropriation of temple treasures with a fleet of 200 sail, and the consul Lutatius Catulus had defeated the hostile fleet off the *Insulae Ægates*, on the west coast of Sicily (241 B.C.), the Carthaginians were compelled to agree to a peace, in which they gave up Sicily to the Romans, and agreed to pay 3200 talents as a war indemnity, while both parties engaged to abstain from attacking each other's possessions. This war, lasting from 264 to 241 B.C., is known in history as the First Punic war, Punic being an adjective derived from *Poeni*, a name of the Carthaginians, which indicates their Phœnician origin.

Sicily was immediately erected, with the exception of Hiero's kingdom, into the first Roman province (See PROVINCE). The Romans then began again to extend their conquests in all directions. Taking advantage of a war in which Carthage was now involved with her mercenaries, they, in violation of their treaty engagements, attacked and subjugated the Carthaginian island of Sardinia (238 B.C.). This they formed into a second province along with Corsica, which had previously fallen into their hands. About the same time they wrested the island of Coreyra (Corfu) and some coast towns from the piratical Illyrians. From 226 to 222 B.C. they were engaged in a more difficult war with Gauls inhabiting the Po basin, but the Romans were again successful, and the Gallic territory was reduced to a Roman province under the name of *Gallia Cisalpina*.

Meanwhile the Carthaginians had been making considerable conquests in Spain, which awakened the alarm and envy of the Romans, and induced them to enter into a defensive alliance with the Greek colony of Saguntum, on the east coast of that country. In 221 B.C. Hannibal, the son of that Hamilcar Barca who had bravely and skilfully maintained the Carthaginian arms in Sicily, and had since founded and in great part established the Carthaginian Empire in Spain, succeeded to the command of the Carthaginian forces. According to Livy's famous story he had, at the age of nine years, been made by his father to swear eternal enmity to Rome. Whether this is true or not, it is certain that he always cherished that enmity, and from the time of his appointment to the command of the Carthaginian forces in Spain was eagerly on the watch for an opportunity of satisfying his hatred. Thus he found in some frontier disputes, which he made the pretext for laying siege to Saguntum (219 B.C.). It was in vain that the Roman ambassadors warned him to desist. He referred them to the Carthaginian government. In the meantime Saguntum was taken after a siege of some months. The Romans then demanded of the Carthaginians the surrender of their general, and when this was refused war was declared. The war that ensued is known as the Second Punic war. As an account of it would be merely that of the achievements and fall of Hannibal himself, it is unnecessary to repeat here the details already given in the article devoted to him.

It is enough to say that the war lasted for sixteen years (218-202 B.C.), that in it the Roman arms met with one of the most disastrous defeats they ever sustained (at Cannæ in 216 B.C.), and that it terminated in favour of the Romans through the defeat of Hannibal by P. Cornelius Scipio at Zama in Africa in 202 B.C. The Carthaginians were forced to accept a treaty in which they engaged never to undertake a war without the sanction of the Romans, and agreed to surrender Spain (which had already been conquered by the Romans, and in 205 B.C. divided into the two provinces of *Hispania Citerior* and *Hispania Ulterior*), to deliver up their ships of war to the Romans, and to pay a yearly tribute of 200 talents.

Rome now turned her arms eastwards. During the last war Philip V., king of Macedonia, had concluded an alliance with Hannibal, and waged war with the allies of Rome in Greece and Asia Minor. As soon, therefore, as their hands were otherwise free, the Romans declared war against him (200). The war was brought to a conclusion by the defeat of Philip by Quinctus Flaminius at *Cynoscephalæ* in 197 B.C. In the peace that was granted in the following year Philip was obliged to recognize the independence of Greece, which had been brought under the Macedonian yoke, but he was allowed to retain his own kingdom. This victory of the Romans, although nominally used for securing the independence of Greece, had in reality no other effect with respect to that country than to put Rome in the place of Macedonia. Some of the Greeks (see GREECE) accordingly appealed for aid in expelling the Romans to Antiochus the Great of Syria, who had a previous cause of quarrel with Rome, and was besides urged to commence hostilities with that power by Hannibal, who had in 195 B.C. come to his court. In 192 Antiochus actually crossed over into Greece, but was soon compelled to recross into Asia Minor, and in 190 B.C. was totally defeated on Mount Sipylus, near Magnesia in Lydia, in consequence of which he was compelled (188 B.C.) to give up all his possessions in Asia Minor to the north and west of Mount Taurus. These were distributed among Roman vassals. Nine or ten years after this Philip V. of Macedonia was succeeded by his son Perseus. Having secured his succession by compassing the death of his younger brother Demetrius, who was favourably inclined to the Romans, and whom he suspected that they would therefore support in opposition to him, Perseus felt that war with Rome was inevitable, and immediately on his accession began to make extensive preparations. In 171 B.C. war actually broke out, and it again terminated disadvantageously for Macedonia. Perseus was defeated by Paulus Æmilius at Pydna in 168 B.C., and Macedonia was thereupon seized by Rome although not on this occasion converted into a province. This was done twenty years later (148 B.C.), after the suppression of an insurrection that had broken out in favour of one who gave himself out as the son of Perseus. Before the Romans had on this occasion withdrawn, the Greeks made another attempt to free themselves from Roman dictation, but it only led to their being deprived of even that nominal independence which they still retained. After a short war, in which Corinth was taken by storm, and burned to the ground by the uncultivated consul Mummius, Greece also was made a Roman province under the name of *Achaia* (146 B.C.).

The same year that put an end to the last semblance of independence in Greece witnessed also the final and utter destruction of Rome's former rival, Carthage. This city had again risen to a condition of comparative prosperity which reawakened the

envy of the Romans, who began to meditate its complete annihilation. Since the second Punic war Rome had cultivated friendly relations with Masinissa, king of Numidia, whose dominions were contiguous to the Carthaginian territory. In reliance on the support of Rome, this king had begun to extend his possessions at the expense of Carthage, which, provoked by repeated encroachments on her frontiers, at last took up arms. This was denounced at Rome as an infringement of the treaty which bound Carthage never to enter on a war without the permission of her former conqueror, and war was therefore declared against her (149 B.C.). The Carthaginians, knowing their inability to contend with Rome, offered to submit to almost any terms by which they could avoid war. In answer to this offer the Romans demanded, first, that 300 of the nobles and youth of Carthage should be handed over as hostages, and next, that their arms and ships should be surrendered, and when both these mandates were obeyed, they finally pronounced the sentence that the city of Carthage should be levelled with the ground, and that the inhabitants should not be permitted to rebuild at a less distance than 12 miles from the sea. This last demand roused in the Carthaginians the courage of despair, and they determined, rather than forsake their native city, to perish in its ruins. For three years they defended themselves with obstinacy and skill, but the city was at last taken by the younger Scipio, a son of Paulus Aemilius, but by adoption a member of the Scipio family. The 50,000 inhabitants of Carthage who had escaped the sword, famine, and pestilence, were dragged into slavery, the city, in accordance with the orders of the senate, was demolished, and the plough drawn over its site, which was ever after to remain accursed. The conquered territory was then erected into the Roman province of Africa (146 B.C.). This is what is known as the Third Punic war.

Nearly 200 years had now elapsed since the outbreak of the first Samnite war, and the reader has seen how continuous and rapid the advances of Rome were during that period. But the more it increased in extent of territorial dominion, so much the more did it lose in heroic spirit, social virtue, and patriotism. Members of the higher families, in the capacity of proconsuls and propraetors were sent into the provinces, in which they had the entire administration and jurisdiction in their own hands, and for the most part they looked more to their own advantage than that of the provinces in the discharge of those duties. Thus the utmost violence and extortion were rife. There was, indeed, a law at Rome by which oppressed provinces could reclaim what had been wrongfully exacted from them on the expiration of the period during which their governors held office, but then they had to come to Rome and lay their accusations before a body of judges the greater part of whom had profited, or were profiting, or hoped to profit, in the like unjust way. Before such a court it is not wonderful that the provinces were not often successful. Sometimes, it is true, when the case was very clear and flagrant, a governor would be condemned, but even then the punishment was usually little more than nominal. Sometimes single provinces, when greatly oppressed and no longer able to bear the violence of their masters, would rise in arms and attempt to throw off the yoke. The first instance of such a rising was furnished by the inhabitants of the Spanish Peninsula, especially the Lusitanians, a brave people inhabiting the south-west, including the modern Portugal, and a tribe in the north, having for their chief town Numantia. After a stubborn resistance both were subdued. Numantia endured a protracted siege, but at last fell through famine

before Scipio the Younger, the destroyer of Carthage (133 B.C.). Three years after this the Romans received by bequest the dominions of Attalus III. of Pergamum (Mysia, Lydia, Caria, and Phrygia), which they formed into the province of Asia.

Within Rome, also, strife between different classes again began to be bitter. Since the period at which we last took a glance at the internal affairs of Rome, two changes had taken place, one to the advantage of the great mass of the people, and the other to the advantage of some of the wealthier families, but both of which tended to the maintenance of the struggles between classes. The first change furnished the great body of the people with the means of carrying on the war against the privileges of the rich, and the second formed the chief grievance of which they had to complain. The change to the advantage of the people was the growth of the democratic influence in legislation. It has already been mentioned that by the Horatian and Valerian laws the *plebs* or decrees of the people passed in the *comitia tributa* received the force of laws provided they were sanctioned by the other *comitia* and the senate, and that in process of time this sanction became a matter of form. This time was reached probably in the third century, at any rate the legislative powers of the people in the most democratic of the *comitia* were in full vigour at the time at which we have now arrived. Further, a change in a democratic direction had been made in the constitution of the *comitia centuriata*. It was now mixed with the *comitia tributa*. In what way this was done is not exactly known, but it was probably by dividing, not the whole body of the people into classes but each of the tribes into classes, and then again into centuries. Although it is undoubtedly the case that this change (whatever its exact nature may have been) had the effect of giving a more democratic character to the *comitia centuriata* than it had formerly possessed, yet it still remained more aristocratic than the *comitia tributa*, and as it was at the option of the magistrates who had the right of assembling the people in the *comitia*, to call them together in either form, it was often possible for one magistrate to reverse by means of one of them what had been enacted by the other. The powers of the third *comitia* (*curiata*) were now altogether nominal. The other of the two changes above referred to was this. The upper families (not now the patricians, but those wealthy and influential families, whether patrician or plebeian, which managed to keep to themselves almost all the posts of honour and power, and along with the equestrian order, and all the supporters of their privileges generally, assumed the title of *optimates*) not only secured to themselves almost exclusively the lucrative management of the provinces, but contrived to bring by one means or other into their own hands all the cultivated lands of Italy, whether originally public land or the private property of the farming class. Thus vast numbers of the middle class of citizens were reduced to absolute want, and driven from their homes. To remedy this the two Gracchi, Tiberius and Caius, successively proposed measures for the better distribution of the land, and in general for the relief of the destitute classes. They thus, as was natural, incurred the violent hatred of the nobles, and both of them lost their lives in the party struggles that ensued. When no other means was found of avail to destroy the influence of the Gracchi the nobles raised the cry that they were aiming at kingship, a cry always fatal at Rome, however unreasonable, and the mere suggestion of the thing procured the death of each of them, the one in 133 B.C., the other ten years later (123 B.C.). No sooner was the younger of them (Caius) dead than

all the enactments due to him were abrogated, and the people found themselves in a condition still worse than they had been in before, a cause of ever-renewed strife.

The only important external war that was carried on during this period was with the tribes in the south-east of Gaul beyond the Alps. The Romans had formed an alliance with the Greek colony of Massilia (Marseilles), in aid of which they were twice called in to quell the Gallic tribes who had risen against it (first in 154 B.C., and next in 125 B.C.) On the second occasion, after putting down the risen tribes (125-123), they kept possession of the conquered country, and made it a Roman province (Provincia Gallia—Provence).

The two most violent adversaries produced by these party struggles—Marius, belonging to the party of the people, and Sulla to that of the nobles—both gained their first distinction in a war that arose in Numidia in Africa. Jugurtha, the grandson of that Masinissa who became the ally of Rome about the time of the conclusion of the Second Punic war, having been left heir to the Kingdom of Numidia jointly with two cousins, put one of them to death (118), and when the survivor appealed to the Romans and obtained from them an award according to which he was to receive half the Kingdom of Numidia, contested his claim by arms, and ultimately subdued and put him to death also (112). In the same year Rome declared war against Jugurtha, who, however, by bribing the generals, managed for some time to keep them from seriously attacking him. But at last the Romans determined to push the war and punish Jugurtha, for the inactivity of their army had brought disgrace on the Roman name. Metellus, an able general and upright man, was accordingly appointed to carry on the war, but while he was taking efficient measures for bringing it to a close he was recalled, and replaced by Marius, one who had at first gone out with the army in the exercise of a very subordinate command. When the elections were coming on at Rome he left the army, returned to Rome, offered himself as candidate for the consulship on the popular side, was elected, and intrusted with the command of the army he had just left. Thus it happened that under him the war was actually terminated, but it was through the schemes of Sulla, who was then a petty officer in the army of Marius, as Marius himself had been in that of Metellus, and who induced the King of Mauritania, to whom Jugurtha had fled, to deliver up the refugee (106 B.C.). Of this Sulla boasted to the end of his life, to the great vexation of Marius, who would have taken Jugurtha captive in a short time had not Sulla anticipated him. From this time forward those two appear as constant rivals and enemies. Every high office and position of power were sought by both at once. Whenever there was any expedition on hand there was a bitter contest between them, supported by their respective parties, for the conducting of it. Thus it fell to Marius to repel the invasions of the province of Gaul by the Cimbri and Teutones in 102-101 B.C., and to Sulla to put down the Roman allies in Italy, who rose in 90 B.C. to demand the right of equal citizenship with the natives of Rome. This war, known as the Social war, lasted for two years (90-88 B.C.), and ended in the victory of the Romans, who, however, found it advisable to concede the franchise to the Italian tribes to prevent another rising. In the same year in which this war was concluded it fell to Sulla, after a violent struggle, to carry on the war against Mithridates, king of Pontus, in Asia Minor, to punish him for his attempt to raise the Greek states and the Roman tributaries in Asia Minor in revolt against Rome. As soon as Sulla had left Rome, however, Marius, with the help

of his own party, succeeded in getting a reversal of the decree by which Sulla was made general against the Asiatic king, and in securing the command for himself. But the power once given was not so easily resumed. Sulla, on receiving the order to give up his command, only answered by leading his army back to Rome and compelling the people to pronounce Marius and twelve of his confederates traitors. He then set forth on his expedition took Athens by storm, devastated Greece and compelled Mithridates to flee, thus confirming the power of Rome in those parts in which that Asiatic prince had sought to shake her influence (86-84 B.C.).

On his return to the city Sulla felt himself at liberty to take his revenge on the Marian party (Marius himself having died in the meantime) for the atrocities it had been guilty of towards his own party in his absence and he took it in full measure. Four thousand of them he caused to be massacred in the circus in one day and then got rid of all the chief men of the democratic party by proscription (See PROSCRIPTION). He was now appointed dictator for an unlimited term (81) and as such passed a series of measures the general object of which was to restore to the constitution its former aristocratic or oligarchical character. The chief of these were one which deprived the tribunes of their main powers, and another which decreed that all the judges should be chosen from the senate but both of these were repealed ten years later. In the beginning of 79 B.C. Sulla retired into private life, and he died the year following.

The man who now came most prominently before the public eye was Pompey, one of Sulla's generals. He was thus an adherent of the aristocratic party, to which he remained attached for some years longer, then broke with it, and ultimately joined it again, became its leader, and fell with it. His first important achievement was the subjugation of the remnant of the democratic or Marian party that had gathered round Sertorius in Spain (76-72). On his return he extinguished all that remained of an insurrection of slaves (71), and in 70 B.C. was consul. It was now that he renounced his allegiance to the aristocratic party, and began to seek the favour of the people, with which view he proposed and passed the laws by which the two chief measures of Sulla were repealed. In 67 B.C. he drove the pirates from the Mediterranean, and afterwards reduced the level part of Cilicia, which he made into a Roman province. He was then appointed to continue the war that had been renewed against Mithridates, king of Pontus. This prince had meantime repeated his attempts to curtail the power of the Romans in Asia Minor, and had made incursions into Roman territory, but after being compelled by Lucullus to retire first to his own kingdom, then to the neighbouring kingdom of Armenia, he was finally subdued by Pompey, who formed part of his dominions in Asia Minor into a Roman province, and distributed the rest among kings who were the vassals of Rome. In 64 B.C. Pompey put an end to the dynasty of the Seleucids in Syria, and converted their kingdom into a province, and in 63 B.C. advanced southwards into Judea, which he made tributary to Rome. All these arrangements were made by him of his own authority. In the very year in which they were completed a member of the aristocratic party, the great orator Cicero, had earned great distinction by detecting and frustrating the Catilinarian conspiracy. See CATILINE.

Only three years after these events (60) a union took place at Rome of great importance in the history immediately subsequent. Caius Julius Caesar, one who had attached himself to the democratic party, Pompey, and Crassus, formed what is called the first

triumvirate, that is, union of three men, and practically, by flattering and gratifying the mob, took the government of the Roman Empire into their own hands. On the part of Cæsar this was the first step in a career which culminated in the overthrow of the republic, and his own elevation to the position of sovereign of the empire. His next step was, after his consulship in 59 B.C., to get the province of Gaul (that is, the Roman part in the south east) secured to himself for five years with a moderate army, which were afterwards continued to him for other five years. This time he employed in training his army by constant wars with the Gauls, and also with the Germans and Britons, and in rendering it devotedly attached to himself. The results of these wars were, first, to extend the Roman dominion in Gaul as far as the Rhine, and secondly, to put in his hands an instrument for carrying out further designs. While Cæsar had been thus employing his time in Gaul, Pompey had been staying at Rome increasing his influence with the aristocratic party. Most had now come to see that a struggle between the two was inevitable, and the only doubt was as to which of the two was the stronger. The short civil war of 49-48 B.C., and the great battle of Pharsalia in the latter year, decided this. Pompey's army was utterly routed, he himself was compelled to flee, and having gone to Egypt was there murdered. In a short time Cæsar utterly subdued the remains of the Pompeian party, and by his wise clemency attached the Romans to himself. He was loaded with honours, and after the final overthrow of his enemies was virtually king in Rome. Numidia, which had sided with Pompey, was in 46 B.C. reduced by Cæsar to a Roman province. There were still, however, some firm friends of the old republic who did not see that its day was irrevocably past, and many others envious of the fortune of Cæsar and cherishing private grudges against him. Among these a conspiracy was formed, and by the members of it he was, as is well known, put to death on the Ides (15th) of March, 44 B.C.

The republic was now restored, but only for a brief space. The main result of the conspiracy was that the first place in Rome had again to be contested. The competitors this time were Octavianus, the grand nephew and adopted son of Cæsar, then only nineteen, and Mark Antony, one of Cæsar's generals. In 43 B.C. these two formed with Lepidus what is known as the second triumvirate, and after avenging the death of Cæsar and putting an end to the republican party in the battle of Philippi (42), Octavianus and Antony, casting off Lepidus, who was a weakling, divided the empire between them, the former taking Rome and the West and the latter the East. In ten years they were ripe for war, and each began to collect large armaments with a view to it. In the naval battle of Actium (31 B.C.) Antony was defeated. After his defeat he fled to Egypt, whose queen was his ally, and had been present at the battle. But thither he was pursued by the victor, and seeing that Alexandria, the capital of Egypt, was about to fall into the conqueror's hands, he put an end to his own life. At the same time the Egyptian queen, the last of the Ptolemies, made away with herself, and Octavian, entering her capital, added her kingdom, the last remnant of the Macedonian monarchy of Alexander, to the dominions of Rome. Egypt thus became the first province of the Roman Empire strictly so called, for even the shadow of the republic had now disappeared (30 B.C.). Not long after this Octavian received the title of Augustus (sacred, venerable), the name by which he is known in history as the first of the Roman emperors.

Various circumstances conducing to render it easy for Augustus to inaugurate the Roman Empire.

His own victories and his relationship to Julius Cæsar gave him a better claim than any one else to the rank of emperor, and the minds of the people were now thoroughly prepared to submit to the empire. The better classes were by this time utterly wearied of the civil strife and carnage that had so long prevailed, and were glad to accept any government that offered the prospect of order and rest, and the great mass of the people had now lost that heroic spirit and love of freedom which distinguished them in their early history, and only desired, as a Roman satirist of a later date says, bread and public spectacles, for both of which they looked to their rulers. It is a remarkable fact that under the empire a large part of the populace were absolutely idle and depended for their support upon the supplies of grain which the emperors brought from the provinces and distributed among them. In his administration of the empire Augustus acted with great judgment. He avoided the name of king, so obnoxious to the Romans, and adhered to most of the republican forms of government. The senate acted the part of a council of state. The republican magistrates were still elected by the popular assemblies, but they were elected pretty much at the dictation of the emperor, and were destitute of any real power beyond what the emperor pleased to intrust to them. He contrived in course of time to obtain for himself all the offices of highest authority, those of consul, imperator and proconsul in all the provinces, *magister morum* and *pontifex maximus*, as well as the powers of a tribune, and all these he got renewed from time to time. For the maintenance of order he established a city militia (*cohortes urbanae*), and for his protection a body guard (*cohortes pretorianæ*). Another judicious arrangement of Augustus was the division of the provinces of the empire into two classes, imperial and senatorial, undertaking to govern the former himself (by means of legates), while he permitted the senate to distribute the others among proconsuls and prætors, as had been done under the republic, with this difference only, that they were now paid. (See PROVINCE.) Into the class of imperial provinces he put all those in which the power of Rome was not yet firmly established, thus seeming to assume to himself the most troublesome task, while his real object was to keep to himself all those provinces which afforded any pretext for the maintenance of an army.

The reign of Augustus is chiefly remarkable as the golden age of Roman literature, but it was a reign also of conquest and territorial acquisition. Before the annexation of Egypt Pannonia had been added to the Roman dominions (35 B.C.), and by the subsequent conquest of Moesia, Noricum, Rætia, and Vindelicia, the Roman frontier was extended to the Danube along its whole course. Gaul and Spain also were now finally and completely subdued. The empire of Augustus thus stretched from the Atlantic to the Euphrates, and from the Rhine and the Danube to the deserts of Africa. The districts in Asia Minor west of the Euphrates that were not yet directly subject to Rome were completely under Roman influence, and were reduced to Roman provinces by the following emperors. A war that was carried on under Augustus with the Germans, and of which some account will be found in the article GERMANY, was less successful than his other wars. Augustus died in A.D. 14.

The empire that may be said to have begun with Augustus lasted, at least nominally, for more than 500 years, till A.D. 476, but long as this period is, it is one comparatively barren in events. After the time of the first emperor Rome ceases to advance with the rapid and unceasing strides that we have hitherto seen her making, and although she still, at

considerable intervals, makes accessions of territory, she is principally engaged in defending her vast frontiers against the barbarian tribes that dwell round them. There is a considerable sameness in the chronicles of her long succession of emperors, most of whom it will be enough to name. The main results of this period of Rome's history were the spread of Roman civilization to her remotest provinces (all of which were now better governed than under the republic), the gradual formation and codification of a body of law that has formed the basis of that of most of the subsequent civilized nations of Europe, and the slow growth of Christianity within it into a power which was able to take its place as a civilizing agency after its fall.

Augustus was succeeded by his step son, Tiberius, under whom the monarchy became a tyranny. He gathered the body-guard or prætorian cohorts, which had previously been scattered over the different regions of the city, into a fortified camp in the north-east of the city. Being thus united these troops became a formidable instrument of oppression in the hands of the emperors, often, however, an object of terror to the emperors themselves, whom they at times made and unmade at pleasure. Under Tiberius the popular assemblies ceased to be held, and their electoral functions were transferred to the senate. Tiberius died in A.D. 37, and was succeeded by his grand nephew, Caligula, and he again in A.D. 41 by his uncle, Claudius, who was forcibly raised to the post by the imperial body guard. Neither of these two reigns was in any way remarkable. On the death of Claudius in A.D. 54 his son Nero, the last of the family of the Cæsars, became emperor, and he reigned till A.D. 68. The only things worthy of mention that happened during his reign were a fire by which a great part of Rome was destroyed (64), and a persecution of the Christians (to whom the fire was ascribed), which followed, and in which St. Peter and St. Paul are supposed to have suffered martyrdom. Nero was followed by three unworthy emperors, Galba, Otho, and Vitellius, whose united reigns make up not much more than a year, and in A.D. 69 the last of the three was succeeded by Vespasian, then general of the Syrian army, and on the point of marching to the siege of Jerusalem. The completion of this enterprise he left to his son Titus, by whom, after an obstinate resistance, the city was taken A.D. 70. The same reign is remarkable also in connection with ourselves, for in the course of it Agricola conquered Britain as far as the Grampians, and reduced it to a Roman province (77). Vespasian was succeeded in A.D. 79 by his son Titus, whose short reign (79-81) is memorable for the first recorded eruption of Mount Vesuvius (79), which overwhelmed the towns of Pompeii and Herculaneum, from the excavation of which in modern times so important results have been obtained with regard to classical antiquities. After Titus his tyrannical brother Domitian reigned till his death by assassination in A.D. 96, when an aged senator, Nerva, was proclaimed as his successor. Nerva's reign was short (96-98) but beneficent, and he was followed by four emperors, Trajan, Hadrian, Antoninus Pius, and Marcus Aurelius, who reigned for more than eighty years, and under whom the countries making up the Roman Empire enjoyed in common more good government, peace, and prosperity than ever before or after. Trajan (98-117) was a warlike prince, and added several provinces to the Roman Empire. The first of these was Dacia, on the north of the Danube, corresponding to the modern Moldavia, Walachia, and Transylvania, which was reduced to a Roman province at the end of two wars (101-103 and 104-106). The next were Armenia and Mesopotamia, in the

east of the empire beyond the Euphrates, which he obtained after a war with the Parthians (114-116). He also subjected the region on the north between the sources of the Danube and the Upper Rhine (now the Black Forest), and distributed it among Gallic and Teutonic settlers, who were required to pay an annual tribute to Rome of one-tenth of their fruit, grain, and cattle, whence this district was called the Tithe Lands. A rampart, still known as the Devil's Wall (which see), was constructed to protect this territory on the north. The reign of Trajan was the culminating epoch of the Roman Empire, both with respect to extent of dominion and eminence in art, especially architecture. Hadrian (117-138), the adopted son of Trajan was of a more pacific character. In a treaty with the Parthians he surrendered to them all Trajan's Asiatic conquests, and although these were afterwards recovered by the Romans they were never firmly held, but were a continual subject of contest between them and the empire on the east, whether Parthian or Persian. Having thus given up the only part of his dominions which was likely to involve him in war Hadrian devoted himself entirely to the internal affairs of his empire. He himself visited almost all parts of it in order to satisfy himself that the administration was well conducted. It was in his reign that the southern Roman wall or rampart between the Tyne and the Solway Firth was erected to protect the Roman province of Britain from the incursions of the barbarous tribes on the north. His reign is also memorable for the final dispersion of the Jews after the suppression of a desperate revolt (132-135). Antoninus Pius (138-161) was likewise the adopted son of his predecessor, and was quite as pacific as Hadrian in his character. Under him the machinery of the provincial administration and the system of Roman law were developed in all their details. In his reign the northern wall in Britain between the Forth and Clyde was constructed. The next emperor, Marcus Aurelius (161-180), was both the son in law and the adopted son of Antoninus Pius. He combined the qualities of a philosopher (by which epithet he is often designated) and of an able and energetic ruler. On mounting the throne he admitted, under the name of L. Aurelius Verus, and with the title of Augustus, L. Ceionius Commodus, who had been adopted along with himself by Antoninus Pius, to an equal share of power, thus affording the first example of two emperors reigning at once. Verus died in 169, leaving Aurelius sole emperor. The reign of this emperor was much disturbed by frontier wars, first with the Parthians on the east and afterwards with the Marcomanni and Quadi in the north. But Aurelius was successful against all his enemies.

Commodus (180-192), the son and successor of Aurelius, inherited none of his father's good qualities, and his reign, from which Gibbon dates the decline of the Roman Empire, presents a complete contrast to those of the five preceding emperors. He purchased peace with his enemies, and tyrannized over his subjects. His reign was cut short by a conspiracy, in which he himself was put to death. The conspirators raised Pertinax to the throne, but as he turned out to be a different man from what they expected him to be they murdered him in March of the following year (193), upon which the prætorian cohorts offered the empire to the highest bidder. It was purchased by Didius Julianus, who was, however, himself murdered little more than two months after. Meanwhile three generals in different parts of the empire had been summoned by their soldiers to fill the vacant throne—Septimius Severus in Illyria, Albinus in Gaul, and Pescennius Niger in Asia. Of these three Severus was the ablest, and he ultimately managed

to secure the prize for himself, ridding himself of the other two competitors partly by artifice and partly by superior generalship. He reigned from 193 to 211, during which time he restored the empire to its former prestige. He reconquered Mesopotamia from the Parthians, but in Britain he confined the Roman province to the limit of Hadrian's Wall, which he restored. He died at York, leaving the empire to his two sons, Antoninus Caracalla and Geta, the latter of whom was soon after murdered by his brother Caracalla, whose general government was in complete correspondence with this commencement, was assassinated in 217 by Macrinus, the prefect of the praetorian guards, while on an expedition against the Parthians. Macrinus himself now assumed the empire, but in the following year (218) Elagabalus (Heliogabalus) was raised to the empire by his soldiers, and Macrinus having been defeated by him was soon afterwards put to death. Elagabalus was in his turn murdered by the praetorians in 222, when they raised Alexander Severus to the throne. He reigned till 235, and showed himself to be the ablest ruler that the empire had had since Septimius Severus. He made several sound reforms in the government, and was the first emperor who openly extended his protection to the Christians. His reign is also memorable for an event which occurred outside of his dominions—the overthrow of the Parthian rule by the Persians and the foundation of the new Persian Empire of the Sassanids (226).

Alexander Severus was put to death in a rising of the soldiers, which took place while he was engaged on an expedition to the Rhine, and his death was followed by a period of the greatest confusion, in which numerous emperors, sometimes elected by the senate, sometimes by the soldiers, followed one another at short intervals, or claimed the empire simultaneously. These were Maximinus (235–238), the murderer of Alexander Severus, the two Gordians in Africa (237), Pupienus and Balbinus (238), a third Gordian (238–244). The reign of Philip the Arab, which now followed (244–249) was a period of somewhat more repose, and is memorable for the celebration in 247 of the millennium of the foundation of the city of Rome. His successor Decius, a senator of severe manners, and of the old Roman type, found an early death in a war with the Goths (251), a German tribe that had migrated to the Lower Danube, and thence made incursions by sea and by land into the Roman Empire. After his death the dissolution of the empire appeared to be near. In the various provinces of the empire the generals of the Roman armies were saluted by their soldiers as generals, so that this period is often spoken of by the historians of the time as that of the thirty tyrants. Those generally named as emperors during this period of anarchy are Gallus (251–253), Aemilianus (253), Valerianus (253–260), Gallienus (along with his father Valerianus, 253–260, alone, 260–268). Meanwhile the empire was ravaged on the east by the Persian king Shapur (Sapor), while the German tribes and confederations (Goths, Franks, Alemanni) invaded it on the north. Claudius Gothicus (268–270), the successor of Gallienus, distinguished himself during his short reign as an able general. He earned his surname by victories over the Goths. The empire was again consolidated under Aurelian (270–275). He subdued all the other claimants to the imperial dignity, and put an end to the kingdom of Palmyra, which Odenathus had set up on an oasis in Syria, and which was now governed by his heroic consort Zenobia. On the other hand he surrendered the province of Dacia to the northern enemies of Rome, and gave the Roman colonists and Romanized inhabitants of that province settlements

in Moesia, on the right bank of the Danube. He also surrounded Rome with walls, which on the left bank of the Tiber stand to this day. His successor Tacitus (275–276), who boasted of being descended from the historian of that name, perished in an expedition against the Goths, and was succeeded by Probus, a brave and upright man, who began to make various provisions for increasing the internal prosperity of his empire, but was murdered by his soldiers after a reign of six years (282). He was followed by Carus, who died in the following year (283), while carrying on a war against the Persians. He had adopted his two sons, Numerianus and Carinus, as joint emperors, but the former was slain in 284, and the latter in 285, when Diocletian, who had in the year before (284) been called to the empire by his troops, was thus left in undisputed possession of the throne.

The reign of Diocletian is remarkable, as affording the first example of that division of the empire which ultimately led to the formation of the empire of the West and the empire of the East. Finding the number of the barbarian violators of the Roman frontier too great for him he adopted as joint emperor Maximian, to whom he gave in 285 the title of Cæsar, and in 286 that of Augustus, and in 292 each of these associated with himself another, to whom the title of Cæsar was allowed. Diocletian took Galerius, and Maximian his son-in-law Constantius Chlorus. These four now divided the empire between them. Diocletian assumed the government of the East with Thrace, allotting to Galerius the Illyrian provinces, Maximian assumed Italy, Africa, and the islands of the Mediterranean, and left to Constantius Spain, Gaul, and Britain. By this arrangement the empire temporarily acquired a new solidity and strength. This state of affairs continued till 305, when Diocletian, wearied of the task of government, abdicated, and compelled his colleague Maximian to do so likewise. On the abdication of Diocletian there ensued a period of change and disorder, which did not end till in 323 Constantine, the son of Constantius Chlorus, by his victory over his brother-in-law, Licinius, was left sole master of the empire. For the details of this period see CONSTANTINE.

The reign of Constantine is important for several reasons. In the first place, his mother having been a Christian, he had through her influence been rendered favourable to the new religion, to which by the Edict of Milan, issued in 312 before he had become sole emperor, he allowed toleration, and after his becoming sole emperor gave a preference above all other religions, without exactly making it the state religion. He introduced the celebration of the Sunday, founded many churches, granted exemption from taxation to the clergy, and separate jurisdiction to the bishops. He was not himself baptized till shortly before his death. Secondly, it was he that removed the seat of government from Rome to Byzantium, which was hence called Constantinople (330). Thirdly, he completely reorganized the imperial administration. He abolished the praetorian cohorts, and incorporated them with the other troops (312). He separated the civil from the military administration, and for the better government of the empire redivided it into four prefectures, thirteen dioceses, and 120 provinces, which were managed by various grades of officials, the highest of which were in strict dependence on the central government, the next in order upon these, and so on down to the lowest. A similar scheme had been devised but not carried out by Diocletian. Constantine died in 337, leaving the empire to his three sons Constantine II, Constantius, and Constans. But quarrels among themselves, and wars with other claimants to the throne, disturbed

their reign, till in 353 Constantius by the overthrow and death of all other competitors found himself sole emperor. During this time the Alemanni, a German confederation already referred to, had invaded and occupied the tithe-lands, whence they made inroads into Roman Gaul, which they attempted to subdue. Against them Julian, a cousin of Constantius, was now operating, and operating with success. Envious of these successes Constantius recalled the best part of the troops engaged under Julian, but they instead of obeying the call turbulently proclaimed their leader (then at Paris) emperor. While Julian was preparing to answer the call Constantius died at Tarsus (361), whereupon he succeeded quietly to the dignity that he thought of contending for. The reign of this emperor, called the apostate, because he was more inclined to the civilization and mythology of ancient Greece than to Christianity, was distinguished for the impartial administration of justice and the success of the Roman arms, but was unfortunately cut short by the death of the emperor in an expedition against the Persians (363). Julian was succeeded by Jovian, who reigned less than one year, and after his death (364) the empire was again divided, Valens (364-378) obtaining the eastern portion, and Valentinian (364-375) the western. From this division, which took place in 364, the final separation of the eastern and western empires is often dated, but there was at least a virtual, if not a formal, reunion of the empires thirty years later, and we will therefore carry on their joint history to that point.

In the reigns of Valens and Valentinian happened the first of that great series of events known as the migration of nations, which ended in the overthrow of the Roman Empire in the West, and the foundation of the modern political system of Europe. At that time great hordes of Huns, a wild nomadic people of repulsive appearance, streamed into Europe from the steppes of Central Asia. After subduing the eastern Goths (Ostrogoths) they attacked those of the west (Visigoths), but these, since they had already been converted to Christianity, were allowed by Valens to cross from the left to the right bank of the Danube, and settle in Moesia, where they remained in possession of their arms. In their new homes they found themselves exposed to the oppression and rapacity of the Roman governors, and when they could no longer brook such treatment they rose in rebellion, and pressing southwards met and defeated Valens in the sanguinary battle of Adrianople, in the flight from which the emperor lost his life (378). They then turned westwards, spreading desolation all round them, and threatened Italy on the north-east. At this time the West was ruled over by Gratian and Valentinian II, the two sons of Valentinian I, whom they had succeeded in 375. Gratian the Elder, feeling himself unable to cope with the Goths, had recourse in his distress to the brave general Theodosius, then living in retirement in Spain, and appointed him emperor of the East. Theodosius accepted the nomination, and speedily put an end to the Gothic war, settling some of the Goths in the lands that had previously been assigned to them on the south of the Danube, and receiving others as mercenaries into the Roman armies. Some time after (383) Gratian was slain in a rebellion headed by Maximus, a provincial governor who aimed at the empire for himself. His endeavour was, however, frustrated by Theodosius, who defeated Maximus, and confirmed Valentinian II (whose sister he had married) in the possession of the throne. Nine years later (392) Valentinian also fell a victim to a conspiracy, in consequence of which Eugenius was proclaimed emperor of the West, but Theodosius, having defeated and slain this claimant

(394), united the whole empire under his sway, for although his son Honorius had been proclaimed Augustus in the previous year, he was still a mere boy of ten years of age. It is not unimportant to mention here as an illustration of the height to which the moral and spiritual power of Christianity had by this time grown, that on one occasion this great emperor submitted on the demand of Ambrose, bishop of Milan, to make a public avowal of penitence for an act of cruelty of which he had been guilty.

The union of the East and West, which now took place under Theodosius, lasted for only a very short time, for it terminated with the death of that emperor in the beginning of the following year (395), and the two sections of the empire were never again united. By his will Theodosius left the Eastern or Byzantine Empire to his elder son Arcadius, while the Western Empire, comprehending Italy, Africa, Spain, Gaul, Britain, and the western half of Illyria, was left to his younger son Honorius, who was to be under the guardianship of the able and energetic Stilicho. The further history of the Roman Empire in the East will be found in the article *BYZANTINE EMPIRE*, and the remainder of our present sketch will be confined to the empire in the West.

In 402 Alaric, king of the Visigoths, who, as above stated, were settled on the south of the Danube, was incited by the minister of Arcadius to invade Italy, but he was soon forced to withdraw on account of the losses he suffered in battle (403). Scarcely had these enemies retreated when great hosts of heathen Teutonic tribes, Vandals, Burgundians, Suevi, and others, under the leadership of Rhadagais, made an irruption into Italy on the north, but these also were overcome by Stilicho (in the battle of Fiesole or Florence), and compelled to withdraw (406). The ruins of the Teutonic army cast themselves upon Gaul, where, after a long course of plundering, the Burgundians settled on the Rhone and Mount Jura, and founded a kingdom that stretched from the Vosges to the Mediterranean. The Vandals and Suevi finally crossed the Pyrenees, and both settled for a time in Spain, the Suevi in the north-west, and the Vandals in the south. Embarrassed by the number of his enemies Stilicho had deemed it advisable to conclude an alliance with the Visigothic king Alaric, and to promise to pay him yearly a certain sum of money. His enemies now took advantage of this to accuse him of treason, and have him condemned and executed (408), after which they repudiated the treaty with Alaric. At this Alaric was naturally enraged, and he marched into Italy to force the Roman government into compliance with his demands. He advanced up to the walls of Rome, and when the government (stationed at Ravenna) still refused to make any terms of peace, besieged and ultimately took by storm the former mistress of the world, afterwards allowing his army three days' plunder of the city (410). Shortly after Alaric died, and his brother in law Athaulf (Adolphus) then concluded a treaty with Honorius, and retired into Gaul, where the Visigoths founded in the south-west a kingdom, that extended originally from the Garonne to the Ebro (412). About this time also the Romans practically surrendered Britain, by withdrawing their forces from it, and thus leaving it a prey to Scandinavian pirates and northern savages. Honorius reigned till 423, and after an interval of two years, during which a usurper, Joannes, claimed the throne, was succeeded by his nephew Valentinian III, then a child of six years old. The government was really in the hands of Aetius, an able soldier and statesman. During the greater part of his administration Aetius managed to prevent the influx of barbarians on the north, but on the other hand the loss to the

empire of the province of Africa was in a great measure attributable to him. With Bonifacius, the governor of that province, he lived at enmity, and Bonifacius fearing the hostile measures of Aetius called to his aid the Vandals from Spain, under their leader Genseric. Genseric readily obeyed the call (429), and although Boniface speedily repented of the step he had taken, and opposed the progress of the Vandals in Africa, it was too late. The province was wrested from the empire, and a Vandalic kingdom set up in its place.

About the middle of the fifth century the Roman Empire was fast hastening to its close. It had already been deprived of almost all its members in the north, west, and south—only in the north of Gaul a strip of territory still remained under a Roman governor. In Italy itself the maintenance of the empire depended chiefly on the abilities of a single man. Just then the Huns, who since their last appearance had been settled in Pannonia (a region corresponding in great part to the modern Hungary), left their settlements in immense numbers under their king Attila, and in conjunction with various subject or allied Teutonic tribes destroyed the royal house of Burgundy at Worms, and then invaded what remained of the Roman province of Gaul. Here, in a great battle fought on the Catalaunian plains in 451 (see FRANCE—History), Aetius managed to check their career in that direction, but they immediately turned south into Italy, where they destroyed Aquileia, took Milan, Pavia, Verona, and Padua by storm, laid waste the fruitful valley of the Po, and were already advancing on Rome when the Roman bishop, Leo I., succeeded in inducing them to conclude a peace with Valentinian, and withdraw. Soon after their leader Attila died (453), and after that the Huns were no longer formidable. In 454 Valentinian slew with his own hand Aetius, the last pillar of the empire. In the year following (455) the death of Valentinian himself was contrived by Petronius Maximus, who was named his successor. To avenge her husband's death Eudoxia, the widow of Valentinian, is said to have appealed to the Vandals for help, and however that may be, the Vandals did actually soon after land under Genseric at Ostia, whereupon they proceeded to Rome, which they took and afterwards plundered for fourteen days, showing so little regard to the works of art it contained as to give to the word *vandalism* the sense it still expresses (455). They then returned to Africa with their booty and prisoners. Meanwhile Petronius Maximus had been killed in the same year in which he had been named emperor (455), and had been succeeded by Avitus. Under him the Suevian Ricimer, the commander of the foreign mercenaries at Rome, attained such influence as to be able to set up and depose emperors at his pleasure. Before his death in Aug. 472, Majorianus (467–461), Severus (461–467), Anthemius (467–472), and Olybrius (472–473) succeeded Avitus and one another. After his death three other emperors followed, Glycerius (473–474), Julius Nepos (474–475), and Romulus Augustulus (475–476). The election of the last of these so-called emperors, who was the son of an ambitious general (Orestes), had been secured through the aid of the German troops in the pay of Rome, and these demanded as a reward a third part of the soil of Italy. When this demand was refused, Odoacer, one of the boldest of their leaders, put Orestes to death, deposed his harmless son, to whom he allowed a residence in Lower Italy with a pension, and assumed to himself the title of King of Italy, thus putting an end to the political history of Rome, A.D. 476.

Among the principal works on Roman history are the following—L. de Beaufort, *Sur l'incertitude des cinq premiers siècles de l'histoire romaine*, the first

work in which the authenticity of the early history of Rome was questioned (Utrecht, 1738), Gibbon's *History of the Decline and Fall of the Roman Empire*, Niebuhr's *History of Rome*, Arnold's *History of Rome*—to the end of the second Punic war, Sir G. C. Lewis's *Inquiry into the Credibility of the Early Roman History*, H. G. Liddell's *History of Rome* (two vols.), and Student's *History*, by the same, Dyer's *History of the Kings of Rome*, Mommsen's *History of Rome* (down to B.C. 46, translated into English by W. P. Dickson, now six vols.—the original still uncompleted), Ihne's *History of Rome* (five vols.), Long's *Decline of the Roman Republic* (five vols.), Duruy's *History of Rome* (six vols.—a finely illustrated work), Mervale's *History of the Romans under the Empire* (eight vols.), Bury's *History of the Later Roman Empire* from Arcadius to Irene (A.D. 395–800, two vols.), Hodgkin's *Italy and her Invaders* (eight vols.), Shuckburgh's *History of Rome*.

Description of the Ancient City—The charm of beauty and dignity still lingers around the ruins of ancient, as well as the splendid structures of modern Rome, and brilliant recollections of every age are connected with the monuments which meet the passing traveller at every step. The characteristics of ancient and modern times are nowhere so distinctly contrasted as within the walls of Rome. Ancient Rome was built upon several hills, which are now in part indistinguishable owing to the vast quantities of rubbish with which the valleys are filled (See the preceding historical sketch). Within the city, in its widest extent, the Tiber, the river on which it stands, has a general direction of north to south, but makes two nearly equal bends, the upper one to the west and the lower one to the east, so as to resemble the letter S. The upper bend incloses a large alluvial flat, little raised above the level of the stream, and well known by the ancient name of the Campus Martius. This flat was altogether without the seven hilled city of Servius Tullius, by which it was bounded on the east and south. On the north-east it was bounded by the Pincian Hill, which was also beyond the limits of the Servian city (See CAMPUS). The eastern bank of the Tiber was so low as to subject the city to frequent inundations. The streets of ancient Rome were crooked and narrow. It was rebuilt, after its destruction by the Gauls in 390 B.C., with great haste and without regard to regularity. It was greatly improved by Augustus by the addition of a number of handsome buildings, but the general character of the street architecture was not altered till after the fire that took place in Nero's reign, when the new streets were made both wide and straight. It is difficult to form an estimate of the population of Rome at its most flourishing period, but there appears to be good ground for believing that in the reign of Augustus it amounted to about 1,300,000, and in that of Trajan was not far short of 2,000,000. Rome is said to have been surrounded by walls at three different times. The first of these was ascribed to Romulus, and inclosed only the original city on the Palatine. It had three gates. The second wall, attributed to Servius Tullius, was much more extensive. It was 7 miles in length, and embraced all the hills that gave to Rome the name of the City of Seven Hills, the Palatine, Saturnian or Capitoline, Aventine, Quirinal, Viminal, Esquiline, and Caelian. It did not include any part of the Janiculum on the right bank of the river, as it is often represented to have done. It consisted of a stone wall supported at the back by an *agger* or bank of earth, and there was a ditch outside 30 feet deep, and 100 feet wide at bottom. The wall was built of great blocks of stone, and without mortar.

A part of it divested of the agger is visible opposite the railway-station, on the departure side. The east side of the Capitoline Hill was left undefended by the Servian wall, as being sufficiently strong by nature. At two points the wall met the Tiber, and the river bank between them was also left without any wall. The number of gates in this wall is uncertain. Pliny says thirty-seven, but this number is generally thought too large. Most probably it includes a number of mere openings in the wall, made to connect the Servian city with the suburbs after the wall had ceased to be the true boundary of the city, and when it was no longer required as a means of defence. The third wall is known as that of Aurelian, because it was begun and in great part finished by the emperor of that name, who reigned from 270 to 275 A.D. It is mostly the same with the wall that still bounds the city on the left or east bank of the Tiber, but on the right or west bank the wall of Aurelian only embraced the *arx* or citadel of the Janiculum and an inclosed strip between it and the river. The wall was about 11 miles in circuit, and was built mainly of brick, with occasional portions of stone. It is still in some parts as it was left by Belisarius, by whom it was partly rebuilt. It has towers and bastions at intervals, and runs from the river at Porta del Popolo to the river at Monte Testaccio. It inclosed, in addition to the city of Servius Tullius, the Campus Martius on the north-west, the Pincian Hill on the north, on the east the Esquiline Plain, and on the south west a small hill called Mons Testaceus. The number of the gates was fourteen.

Ancient Rome had seven bridges across the Tiber, of which four still stand. The lowest and oldest bridge was the Pons Sublicus, which led from Mount Aventine into the valley below the Janiculum, and is no longer standing. The first bridge on this site was attributed to Ancus Marcius, and was of wood (whence its name, signifying 'pile bridge'). It was an article of religion among the Romans that when there was need of rebuilding it, wood should always be the material. The original reason of this was no doubt that, when it was the only bridge across the river, it might easily be destroyed on the approach of an enemy. The second led from the forum to the Janiculum, and was called Pons Palatinus, Senatorius, or Æmilius. It was the first stone bridge in Rome, and is supposed to be that which till lately existed under the name of Ponte Rotto (broken bridge). Two bridges led to the island in the Tiber, one from the east and the other from the west side, the former was called Pons Fabricius (now Ponte de' Quattro Capì) and the latter Pons Cestius (now Ponte San Bartolommeo). A fifth bridge, Pons Aurelius or Janiculensis (now Ponte Sisto), led from the Campus Martius, near the theatre of Marcellus, to the Janiculum. The ruins of some of the piers of the sixth, Pons Vaticanus or Triumphalis, which led from the Campus Martius to the Vatican, an open space beyond the walls on the west bank of the Tiber, are still visible when the river is low. The Ælian Bridge (Pons Ælius, now Ponte Sant' Angelo) led to the Moles Adriani. Beyond the wall, and above the Pincian Hill, was an eighth bridge, Pons Milvius (now Ponte Molle), built by Æmilius Scaurus, after the time of Sulla, and still used.

The open spaces in ancient Rome, of which there were a great number, were distinguished into *campi*, wide areas covered with grass which served for popular assemblies, public processions, for the exercise of the youth in arms, and for the burning of the dead bodies, and *fora*, which were paved, and served either for the assembling of the people, for the transaction of public affairs or for the sale of goods, or for orna-

ment, and *aræ*, a term applied to open spaces generally, and hence to all those which were neither *campi* nor *fora*, such as the squares in front of palaces and temples. Of the *campi* the most celebrated was the Campus Martius already mentioned, and after it the Campus Esquilinus on the east of the town, in great part converted by Mæcenæ into pleasure-grounds attached to his palace. Among the latter the Forum Romanum, which lay north west and south east, between the Capitoline and Palatine Hills, and the Forum Trajani, between the Capitoline and Quirinal, are the most worthy of mention. The first was the most famous and the second the most splendid of them all. (See FORUM.) Since 1871 much has been done towards clearing the ancient Forum Romanum from the rubbish under which it has so long lain buried.

The earliest division of Rome was made by Servius Tullius. He divided it into four quarters, which he called Tribus urbanae, they were the Tribus Suburana, Collina, Esquilina, and Palatina. (See the previous historical sketch.) This division continued till the reign of Augustus, who divided the city into fourteen regions, according to which ancient Rome is generally described. 1st, Porta Capena, 2d, Caelimontana, 3d, Isis et Serapis, or Moneta, 4th, Via Sacra, afterwards Templum Pacis, 5th, Esquilina cum colle et turri Viminali, 6th, Alta Semita, 7th, Via Lata, 8th, Forum Romanum, 9th, Circus Flaminius, 10th, Palatium, 11th, Circus Maximus, 12th, Piscina Publica, 13th, Aventinus, 14th, Transtiberina. Each of these regions was subdivided into a number of *vici*, or quarters. The principal street in a *vici* was often itself called *vici*. Other principal streets were called *vici*, and the narrower streets *anagorizontes*.

Among the principal streets in Rome, and roads leading out of Rome, we will mention the following. The great central street of the city was the Via Sacra, which began in the Forum, the Clivus Capitolinus forming a continuation of it on the north to the great entrance of the Capitol, while southward it passed from the Forum to the Arch of Titus, and from thence led to the beginning of the Appian Way. A street called the Vicus Jugarius rounded the south eastern slope of the Capitoline from the Porta Carmentalis to the Forum. Two other streets, the Vicus Tuscanus (exposed to view since the commencement of the recent excavations in and around the Forum) and the Via Nova, proceeded in a south westerly direction from the Forum along the valley between the Capitoline and the Palatine. The two principal roads leading out of Rome were the Via Flaminia, or great north road, and the Via Appia, or great south road. The Via Flaminia, which was made after the subjugation of the Cisalpine Gauls, began at the north eastern extremity of the Capitoline, at the Porta Ramenæ of the Servian Wall, and ran through the city north and slightly west. It issued from the Aurelian city by the Porta Flaminia, and then proceeded north and slightly east till it reached Ariminum (Rimini). The Via Appia began opposite the north eastern angle of the Palatine, at the spot where the Arch of Constantine was afterwards erected, proceeded at first south-west between the Palatine and the Caelian, then turned south east and issued through the Servian Wall at the Porta Capena, and through the Aurelian wall at the Porta Appia. Originally it terminated at Capua, but it was ultimately continued to Brundisium. Beyond the Servian Wall the Via Latina diverged from it, and issued through the Aurelian wall at the Porta Latina north east of the Porta Appia. It took a more easterly course than the Via Appia, which it finally joined at Beneventum. The chief eastern roads were the Via Praenestina and Tiburtina.

The temples, palaces, curie or senate-houses, prisons, theatres, amphitheatres, circuses, naumachias, porticoes, basilicæ, baths, gardens, triumphal arches, columns, sewers, aqueducts, sepulchres, &c., are the principal public buildings and monuments. For the capitol, the principal temple of Rome, consecrated to Jupiter Capitolinus, and the Pantheon, see the articles. Next to these the following were the most remarkable: the temple of Asculapius, in the island of the Tiber, which was consecrated to that god, perhaps on the site of the modern church of San Bartolommeo; the temple of Antoninus and Faustina, in the Via Sacra, some parts of which are still standing in or round the church of S. Lorenzo in Miranda; the magnificent temple of Apollo, which Augustus built of white marble, on the Palatine, surrounded by a porticus, containing a splendid library, which served as a place of resort to the poets, who here recited their works; the temple of the Dioscuri, in the Forum Romanum, under the Palatine Hill, near the site of the modern church of Sta. Maria Liberatrice, first built in an early age of the republic, afterwards rebuilt by Tiberius (three splendid columns in Parian marble of the building of Tiberius still stand, and the substructure of the temple has recently been brought to light by the excavations of Cav. Rosa); the temple of the confederacy, under the name of *Templum Duana commune*, which the Latin cities are said to have built in union, by the persuasion of Servius Tullius, and upon a monument in which were inscribed the articles of the confederation (this temple was situated upon the Aventine Hill, probably near the spot where the church of Sta. Prisca now stands); the temple of Hercules and the Muses, built by Fulvius Nobilior, who placed here the images of the Muses brought by him from Ambracia; the temple of Honour and Virtue, built close together by Marcus Marcellus, and adorned by the Marcelli with the Greek works of art from Syracuse; the temple of Jupiter Stator, in which the senate frequently met, on the north eastern declivity of the Palatine Hill, near the arch of Titus; the temple of Jupiter Tonans, built by Augustus with much splendour on the slope of the Capitoline Hill; the temple of Isis and Serapis, which gave its name to the third region; the temple of Juno Moneta, built upon the spot where the house of Manlius was torn down, on the fortifications of the Capitoline Hill; the temple of Liberty, built by Gracchus and restored by Asinius Pollio, who there established the first public library; the temple of Mars Ultor, built by Augustus with great splendour when he recovered the eagles of the legions that had been conquered by the Parthians (three beautiful and lofty Corinthian columns belonging to one of its sides still stand); the splendid temple of Minerva, which Domitian built in the forum; another temple of the same goddess, which Pompey built in the Campus Martius, and which Augustus covered with bronze; the temple of Peace, once the richest and most beautiful temple in Rome, built by Vespasian, in the Via Sacra, which contained the treasures of the temple of Jerusalem, a splendid library, and other curiosities, but was burned under the reign of Commodus; the temple of the goddess Silus, which was painted by Fabius Pictor, the first Roman painter; the temple of Saturn, on the slope of the Capitoline Hill adjoining the forum, used as the *cræcum* or public treasury (some suppose that the three columns mentioned above as remains of the temple of Castor and Pollux really belonged to this temple); the temple of the Sun, which Aurelianus erected to the east of the Quirinal at an enormous expense, several temples of Venus, and among them particularly the magnificent temple of Venus Genetrix, which Cæsar caused to be built to her as the origin of his family, and the

exact site of which, on the Forum Julium, which adjoined the Forum Romanum, is said to have been recently laid bare, and the temple of Venus and Roma, of which Hadrian himself designed the model, burned down in the reign of Maxentius, but afterwards restored (its remains are still to be seen lying between the church of S. Francesca Romana and the Colosseum); the temple of Vesta, one of the oldest and most remarkable, built on the southern summit of the Palatine, and attributed to Numa, in it were contained the *ancilia*, or sacred shields, and the palladium, sacred fire, &c. The name of temple was also improperly given to a covered passage dedicated to Janus, and situated some distance to the north east of the forum, about half way between it and the Quirinal. Its erection was attributed to Numa. The gates of this passage were opened in time of war and closed in time of peace.

The principal palace of ancient Rome was the *Palatium* or imperial palace, which took its name from being built on the Palatine Hill. It was originally the house of the orator Hortensius, and was enlarged and adopted as the imperial residence by Augustus. Successing emperors extended and beautified it. Nero built two immense palaces. The first, called *Domus transitoria Neronis*, was of such extent that it not only embraced all the Palatine Hill, but also the plain between that and the Cælian and Esquiline, and even a part of the latter of these hills, in its limits. This first palace was burned to the ground in the great fire. He began to replace it by another of the same extent, but did not live to finish it. What was completed of this second palace was ornamented so richly with precious stones, gold, silver, statues, paintings, and treasures of every description, that it justly received the name of *domus aurea* (golden house). Vespasian confined the palace to the Palatine, but even this part was not completed till the reign of Domitian. This huge edifice subsequently became a ruin, and on its site now stand the Farnese palace and gardens, and the Villa Spada. Under the direction of Pietro Rosa excavations have been going on for years on the site of the ancient imperial palace. The most interesting discovery made is the remains of a house with antique wall paintings.

The meeting place of the senate till near the end of the republic was the Curia Hostilia, often called simply Curia, which stood at the north west of the forum. Its name of Hostilia was derived from the fact of its being ascribed to Tullius Hostilius, the third king of Rome. It was destroyed in a riot in 52 B.C., but was rebuilt by Faustus Cornelius Sylla, a son of the dictator Sylla, and called the Curia Cornelia. It was pulled down from party jealousy, and rebuilt by Augustus, who called it the Curia Julia. Middleton identifies it with the church of S. Adriano, at the west end of the forum. While it was erecting the senate met in the Curia Pompeia, attached to the portico of Pompey, in the Campus Martius, and it was there that the assassination of Julius Cæsar took place. A fourth senate house was built by Domitian about midway between the Quirinal and the Palatine. It was called the Curia Pompiliana.

It is doubtful whether there were two public prisons in ancient Rome, or only one. Two names of prisons certainly occur, Carcer Mamertinus and Lautumia, but some think that they were merely different names for the same prison. The Carcer Mamertinus was built on the south eastern slope of the Capitoline. It is said to have been erected by Ancus Marcius, and the subterranean dungeons attached to it were ascribed to Servius Tullius, and hence called the Tullianum. If the Lautumia was

really a separate prison its position can only be guessed at. Some suppose it to have lain on the north side of the forum.

Among the theatres, those of Pompey, Cornelius Balbus, and Marcellus were the most celebrated. Pompey built that which bore his name in the Campus Martius after his return from Greece, and adorned it with the most beautiful Grecian statues. An aqueduct brought water into every part of it. In order to protect it from destruction he built within its precincts a splendid temple to Venus Victrix. It was capable of containing 40,000 persons. It was finished by Calpurnia. Tiberius had previously restored the scenes. Claudius, still later, did the same thing, and the Gothic king Theodoric caused it to be repaired. A few remains of it are yet to be distinguished in the Piazza di Campo di Fiori. The theatre of Balbus was situated to the south east of that of Pompey. It was dedicated in the year 13 B.C. The theatre of Marcellus was begun by Julius Cæsar, and finished by Augustus, who dedicated it to his nephew Marcellus. It accommodated 20,000 spectators. Vespasian restored it. Some beautiful ruins of it are still to be seen, beside the palace of Orsini, not far from the east end of the Ponte de quattro capi. The first stone amphitheatre in Rome was that of Statilius Taurus, in the Campus Martius, built about 30 B.C., and destroyed at the great fire. But by far the most magnificent of this class of buildings was that of Titus, now known as the Colosseum or Coliseum (which see), a building estimated to have been capable of seating 90,000 persons. The principal of the circuses was the *circus maximus*, between the Palatine and Aventine (See CIRCUS). Among the remaining circuses the following deserve to be mentioned: the Circus Agonalis or stadium, in the Campus Martius, the circus of Helio-gabalus, in the gardens of that emperor, the Circus Flaminius, in the Campus Martius, to the north of the theatre of Marcellus, the circus of Maxentius, often called the circus of Caracalla, in the extreme south-east of the city, still in sufficiently good preservation to exhibit the arrangement of the structure.

Without stopping to describe the Naumachie, which are already treated of in the article NAUMACHIA, we will proceed to the porticoes or colonnades, which were public places used for recreation, or for the transaction of business. Among these are the Porticus Argonautarum, also called Porticus Neptuni or Agrippæ, which Marcus Vipsanius Agrippa built in the Campus Martius, surrounded by a laurel grove, and adorned with paintings, representing the history of the Argonauts; the splendid portico of Europa, in the Campus Martius, probably at the foot of Mount Pincius, supposed to have been built by Augustus, and containing the history of Europa, the portico of Livia, on the Esquiline, built by Augustus, and demolished by Nero, the portico of Metellus, founded by Metellus Macedonicus, between the circus of Flaminius and the theatre of Marcellus, and ornamented with statues brought by him from Macedonia, the portico of Octavia, built by Augustus on the site of the last, another portico of Octavia, previously built by Cn. Octavius, on a site between the theatre of Pompey and the Circus Flaminius, and rebuilt by Augustus, sometimes called Porticus Cornithia, from the style of its architecture, the Porticus Milhiarensis, or of the thousand columns, the ruins of which are yet to be seen in the gardens of the Duke of Muli, the portico of Pola, built by the sister of Agrippa, and the portico of Minucius, near the Circus Flaminius, in which the tickets appear to have been given out to those entitled to share in the public distributions of corn. Among the

Basiliæ (which see), one of the most beautiful was the Æmilian, on the north side of the Forum Romanum, built by the Censors Æmilius Lepidus and Fulvius Nobilior 179 B.C., restored by Æmilius Paulus in the time of Cæsar, burned down in the reign of Augustus, by whom it was rebuilt. We will also mention the splendid Basilica Julia (recently completely excavated), on the south side of the Forum, begun by Julius Cæsar, and finished by Augustus, and the Basilica Porcia, which was the oldest, and was built by Cato the censor. The public baths in Rome were very numerous. Those belonging to the time of the empire, called *thermæ*, were spacious and splendid structures, comprising not only places for bathing, but also places for sports and athletic games, walks and plantations, halls, porticoes, libraries, &c. The principal of these were the *thermæ* of Titus, part of the substructure of which may still be seen on the Esquiline Hill, north east of the Colosseum, the *thermæ* Antoninianæ or *thermæ* of Caracalla, still larger than those of Titus, extensive remains of which still exist in the south east of the city, and the *thermæ* of Diocletian, the largest and most magnificent of all, situated in the north east, at the root of the Quirinal and Viminal Hills. The ruins of these last baths are still to be seen opposite the railway station. Ancient Rome was likewise rich in magnificent gardens. The gardens of Lucullus, in the north of the city, on Mount Pincius (hence called *Collis Hortorum*), held the first rank, after these the gardens of Asinius Pollio, Julius Cæsar, Maecenas, Helio-gabalus, &c. Of the triumphal arches the most celebrated are that of Constantine, the best preserved of all, situated in the space between the Colosseum and the north east in angle of the Palatine, the *bassæ* reliefs that adorn it are in great part taken from an older arch of the time of Trajan, that of Drusus, in the Appian Way, now the inner gate of the Porta di S. Sebastiano, that of Gallienus, still extant, near the church of San Vito, on the Esquiline Hill, and those of Severus and Titus, which are yet in good preservation, the former at the end, and the latter in the middle of the Via Sacra. Among the columns the oldest was the *columna Mæmia*, erected in honour of C. Mænius, who took the town of Antium in 338 B.C., and the next in point of age, the *columna rostrata*, erected to C. Duilius in commemoration of his victory over the Carthaginian fleet in 260 B.C., and called *rostrata* from its being adorned with the beaks of ships. The most beautiful was Trajan's pillar in the forum, 117 feet in height, still standing. Instead of the statue of that emperor, which it formerly bore, Sixtus V. placed upon it a statue of St. Peter in bronze, 23 feet in height. The *bassæ* reliefs with which it is ornamented represent the exploits of Trajan, and contain about 2500 half and whole human figures. A flight of stairs within the pillar leads to its summit. A column of red granite, erected to the memory of the Emperor Antoninus Pius, has been lost, except the base, but another erected in the Campus Martius, to the memory of his adopted son, Marcus Aurelius, in imitation of that of Trajan, still stands in the Via del Corso, in an open space beside the Palazzo Chigi. The sewers (*cloacæ*) by means of which the filth and superfluous water of the city were conveyed into the Tiber are among the most remarkable architectural works of ancient Rome. The most celebrated was the *cloaca maxima*, ascribed to Tarquinius Priscus (See CLOACÆ). (Concerning the aqueducts of Rome, of which about twenty have been enumerated, see AQUEDUCT.) Among the magnificent sepulchral monuments, the mausoleum of Augustus, in the Campus Martius, which is now used as a day theatre or circus, and that of Hadrian, on the west bank of the Tiber, at the

north end of the *Ælian Bridge*, surpassed all others in splendour. The latter, stripped of its ornaments, now forms the fortress of modern Rome, under the name of *Castello Sant' Angelo*. Of the other monuments of the same class the most remarkable are the mausoleum of Helena, the mother of Constantine, the ruins of which in the east of the city, on the right hand of the *Porta Maggiore*, now bear the name of *Torre Pignattara*, that of his daughter Constantia, now the church of *Sta Costanza*, the tomb of the Scipios in the south east, discovered in 1780, the tomb of *Cæcilia Metella*, daughter of *Metellus Creticus*, in the south east not far from the circus of *Maxentius*, now called *Capo di Bove*, and the pyramid of *Cestius* in the south, in the wall of *Aurelian*. The city was also rich in splendid private buildings, and in the treasures of art, with which not only the public places and streets, but likewise the residences and gardens of the principal citizens, were ornamented. See *Nardini's Roma Antica* (Nibby's edition, 1818-20, four vols 8vo), *Canina, Gli Edificii di Roma* (with plates, six vols folio, 1848-51), *Dyer's History of the City of Rome* (1865), *Reumont's Geschichte der Stadt Rom* (three vols, 1867-70), *Burn's Rome and the Campagna* (1870), *Harc's Walks in Rome* (1871), and *Days Near Rome* (1874), *Parker's Archaeology of Rome* (1874-80), *Lanciani's Ancient Rome in the Light of Recent Discoveries* (1889), and *Pagan and Christian Rome* (1892), also the elaborate map, *Forma Urbis Romæ*, issued under his editorship (1893 onwards), *Middleton's Remains of Ancient Rome* (two vols 1892), *Schneider's Das alte Rom* (1896).

MODERN ROME, the capital of Italy, and formerly that of the Papal States, the seat of the Papal See, and for centuries the centre of Christianity, is situated on the *Tiber*, about 15 miles from its mouth, and embraces the ground occupied by the ancient city on the left bank, with a considerable space on the right, mainly added during the rule of the Popes. About the middle of the ninth century *Leo IV* built a wall round that part of the slope of the *Vatican Hill* which lies within a line drawn from the *Castello Sant' Angelo* to the crest, then along the crest to the rear of *S Peter's*, and thence to the river, to this, called the *Leonine City*, another portion was added in the seventeenth century, the wall being carried along the crest of the *Janiculum* to a point opposite the *Aventine*, and thence to the river. This was done under the rule of the Popes *Urban VIII* (1623-44) and *Innocent X* (1644-55). The wall on the left bank must be substantially where it was traced by *Aurelian* in the third century, and is mainly the work of that time largely repaired by *Belisarius*, and in portions much later, as in that which may be seen from the *Pincian Gardens* where also is an interesting fragment of the wall of the first century, now only a ruin and known popularly as the *muro torto*, or crooked wall, from being pitched forward by the decay of its foundations. Until the occupation of Rome by the Italian government only the *Campus Martius* (the alluvial plain in the bend of the *Tiber*), the *Capitol Hill*, and portions of the *Ælian*, *Viminal*, *Esquiline*, and *Pincian* were built over, the rest of the area being mainly occupied by villa gardens and vineyards. The present railway station was the limit of inhabitation on that side, and the space beyond, to the north, east, and south of a line drawn in a general direction to the south west as far as the *Colosseum*, was almost without habitations. This space has been almost entirely built over within the last thirty years, only a small portion of the *Esquiline* and a space reserved as a park and archaeological promenade, including most of the antiquities on the south-east, the baths of

Caracalla, &c., being now left open, while considerable suburbs have sprung up in the former fields outside the walls by the *Porta Pia*, *Porta S Lorenzo*, and *Porta del Popolo*. A new quarter has been constructed for the working classes in the section between the *Aventine* and the wall and river, known as the quarter of *Monte Testaccio*, and containing the Protestant cemetery, with the tombs of *Keats* and *Shelley*, and many others of German, English, and American birth.

Gates.—The gates on the left bank, beginning at the north, are the *Porta del Popolo*, by which, in the days of the diligence, travellers coming from *Florence* and the north entered the city, *Porta Pinciana*, recently reopened, *Porta Salara*, so called because the salt went out by it to the provinces, *Porta Pia*, rebuilt from the designs of *Michael Angelo* in 1564, *Porta S Lorenzo*, *Porta Maggiore*, between which two is the opening for the railways, which all come to one station, *Porta S Giovanni*, *S Sebastiano*, and *S Paolo*, which is near the river. On the right bank are the *Porta Portese*, and near it a new opening for the railway station of the *Trastevere*, *Porta S Pancrazio* and *Porta Cavalleggeri* to the west of the *Vatican*, and *Porta Angelica* to the north. Four of the ancient gates are still closed. The river from wall to wall of the city inclosure has a course of about 3 miles, the volume of the water varying with the season and the rains, but as the banks, which were once in a state of nature and the most picturesque confusion and dilapidation, are now inclosed by a long and costly stone wall on both sides of the river (this is one of the recent improvements effected in Rome, the works having been carried out since 1876), the width of the bed may be stated at about 400 feet. Formerly, owing to defective sewerage, the river, during the inundations, ran back into the city and frequently reached the *Corso*, and on more than one occasion the *Piazza di Spagna*, but the recent improvements, the deepening of the river, and the construction of the great collecting drain behind the new embankment, has much diminished the extent of the inundations, and when these works are completed they will be entirely prevented.

Bridges.—There are now ten bridges across the *Tiber* besides the railway bridge. The highest, the *Ponte Margherita*, is opposite the *Piazza del Popolo*, the next, constructed by private enterprise, is the *Ponte di Ripetta*, in the place where the old ferry to the 'Farm of *Cincinnatus*' was, with the ancient *Porto di Ripetta*. This bridge leads to the new quarter on the right bank, which occupies the old meadows called the 'Prati del Castello', being the fields believed to be the farm of *Cincinnatus*, and named from being under the castle of *S Angelo*. Then comes the *Ponte Umberto* (opened in 1895), leading to the newly erected *Palace of Justice* or law courts, on the right bank. The next is the *Ponte S Angelo*, anciently *Pons Ælius*, leading to the castle and still in great part (leaving out of account the statues which line it on both sides) of ancient Roman work. Below it is a new iron trestle bridge, temporarily filling the place of a more substantial one to be built when the means serve right opposite the hospital of *Santo Spirito*. This is to be called the *Ponte Vittorio Emanuele* and just below it are the remains of the piers of the ancient *Pons Triumphalis*. Below this is the iron suspension bridge, then the *Ponte Gianicolo*, *Ponte S Sisto*, *Ponte Garibaldi*. Then come the two bridges which cross the island in the *Tiber* and are called respectively the *Ponte Quattro Capi* from some ancient quadruple busts on the parapet, and the *Ponte S Bartolommeo*, forming one line of communication. The former remains as of old, but the latter, the ancient *Pons Cestius*, has

been renewed. The next below is the ancient Pons Æmilius, at some time broken down near the left bank and restored by a suspension bridge, and afterwards called the Ponte Rotto, but now removed and replaced by a new bridge of fine construction. Below these again is the railway bridge over which passes the railway to Cività Vecchia.

Main Streets—Before the railway was constructed the city was entered from the north by the Porta del Popolo, and the first impression was more characteristic than that from the new station, which is in the midst of new structures. The city of those days seemed to have been planned from the Piazza del Popolo, a fine square with an obelisk in the centre, and fountains and statuary on both sides. From it radiate three streets which were the main avenues of the Papal city, the centre being the Corso, so called from the races which used to take place there during the carnival. It is about 50 feet wide and runs directly towards the Capitol, ending in the Piazza di Venezia, at the southern edge of the Campus Martius. It contains many of the finest of the old palaces and is still the street where the inhabitants in the hours of fashionable promenade drive up and down from the Popolo to the Piazza di Venezia. A few of the shops on it have been reconstructed according to the modern spirit of ostentation, but most of the fine shops are now in the newer streets. The street that goes to the left of the Corso is the Via del Babuino, so called from a mutilated statue which used to decorate a fountain in it, and which the people took for a representation of a baboon. It leads to the Piazza di Spagna, formerly the centre of the strangers' quarter, and thence under the name of the Via dei Due Macelli, to the Via del Tritone, where it ends. The street to the right is the Via di Ripetta, passing near the bank (*ripa*) of the Tiber, which it touches at one point, the ancient Porto di Ripetta, and then is continued as the Via della Scrofa into the heart of the Campus Martius, where it ends in the maze of ancient streets. From the Piazza di Spagna (so called from the palace of the Spanish Embassy to the Pope which is on it) a monumental flight of steps leads up to the Pincian Hill, constructed by the King of France to whom the Pope had given the site in fee simple. The church at the head of the steps was built by Charles VIII. in 1494, and from the Piazza in front of it, the Piazza Trinità de' Monti, there is a fine avenue going to the north to the Villa Medici, the seat of the Academy of France, and to the Pincian Gardens, while to the south two streets radiate from it, the Via Gregoriana, which ends, after a short course, at the Capo le Case, and the Via Sistina, which goes to the Piazza Barberini, then changes its name to the Via delle Quattro Fontane, continuing so to the Via Nazionale, where it becomes the Via di Agostino Depretis, which name it retains as far as the Piazza Esquilina and the basilica of S. Maria Maggiore. Crossing this on the crest of the Quirinal Hill is a street which leads from the Quirinal Palace to the Porta Pia on the north east, being now called the Via Venti Settembre in commemoration of the entry of the Italian troops on that day by the breach near the Porta Pia. In the same line is the Via Quirinale, passing the Quirinal Palace, parallel to which is the broad Via Nazionale. The Via Venti Settembre contains the immense palace of the Treasury, the War Office, the Scotch church and school, many fine new buildings, and, near the Porta Pia, the palace of the English Embassy, with its fine old garden, the last remnant of the old gardens of Papal Rome. The new quarter covering the Esquiline, Viminal, the outer portion of the Quirinal, and the eastern part of the Pincian Hill, was mainly built up during the recent great

fever for extension with huge, ill designed, and flimsy houses, pretentious stucco palaces, but the houses belonging to some of the earlier stages of the epidemic are elegant and substantial, as in the neighbourhood of the Piazza dell'Indipendenza and part of the Via Nazionale, which is the great street of modern Rome, leading from the railway station to the Piazza di Venezia, and after crossing the Corso, continuing to the river under the name of the Corso Vittorio Emanuele. At its upper extremity it enters into the Piazza delle Terme, where are the ruins of the baths of Diocletian, a little public garden, and the larger Piazza de' Termini or Station Square, where the railways all converge. From the station the Via Cavour runs parallel with the Nazionale to the Forum, also a fine street, and like all the streets in this new quarter, wide and well drained. The Via Nazionale contains many fine palaces, and especially notable is that of the Belle Arti, or building for the art exhibitions.

Squares—In the old city there were not many squares deserving notice, the chief being the Piazza del Popolo, already noticed, Piazza di Spagna, Barberini, Campo di Fiori, Piazza di Navona, occupying the site of an ancient circus in which S. Agnes is said to have been martyred, and on which there is a splendid church dedicated to her, de' Montanari, where the peasants from time immemorial have come to make their engagements with the landed proprietors for agricultural labour to be performed, and the Piazza S. Pietro, in front of the basilica of S. Peter. In the new quarter there is the Indipendenza, Vittorio Emanuele, Dante, Esquilino, Guglielmo Pepe, &c., none except the Indipendenza of any attraction. A little piazza near the Navona is worth attention as having been for centuries the location of the famous statue of Pasquino, on which the satires of the day, against Popes, princes, and follies, were posted, whence called *pasquinades*. The statue still exists and has been a noble work of Greek art, though now so battered and mutilated as to betray its character only to trained eyes. The principal open places for promenades are the gardens of the Pincian, overlooking the Piazza del Popolo, the new Corsini gardens on the Janiculum, giving the finest view of Rome that is to be had from any point, and on two days of the week the magnificent grounds of the Villa Pamphili Doria and six days the Villa Borghese grounds, just outside the Porta del Popolo, extremely picturesque, but like those of the Pamphili Doria, not to be visited safely in the hours towards sunset on account of the malaria at certain seasons of the year. On Sundays of the winter and early summer the Borghese is the resort of immense numbers of Romans and strangers.

Ecclesiastical Edifices—Rome is filled with churches, most of which are scarcely worth attention. It used to be said that there were 365 churches, one for every day in the year, but the number has been much increased lately, not only by the construction of new Roman Catholic churches, but by several Protestant places of worship, which, in the days of the Popes, were not admitted within the walls. The first Protestant place of worship within the walls was a room in a palace in the Via Condotti, hired by the American consul in 1862 for the use, nominally of the American Legation, but really for religious services. The Americans have since built a fine church on the Via Nazionale, designed by Street, and in which are some mosaics designed by Ed. Burne Jones, the Anglican church has a building on the Via Babuino; the Scotch one on the Venti Settembre, and several others are planted in various parts of the city. The number of churches must be now more than 400. Of the ancient churches the chief is of course S. Peter's,

for the history and description of which see *PETRE*'s, *S. S. Giovanni Laterano*, near the *Porta S. Giovanni*, is the mother church of Catholicism. It stands, according to tradition, on the site of the residence of a Roman senator *Lateranus*, a convert to Christianity and who gave his house for a place of worship, supposed to be the first so dedicated in Rome, and therefore entitled 'omnium urbis et orbis ecclesiarum mater et caput'. There is adjoining it a baptistery said to be that in which *Constantine* was baptised, but in all probability later, though still a fine early example of Christian architecture. By the numerous restorations and alterations *S. Giovanni Laterano* has been so changed that we see now very little of the ancient church, and its pretentious façade by *Alessandro Galilei* tells but little in favour of the taste of the 18th century, in which it was added. It is a huge portico with colossal statues of our Saviour and ten saints on the top of the entablature. This church is remarkable as having been the seat of five councils of the church. *S. Maria Maggiore* ranks third amongst the basilicas. It was founded by *Pope Liberius* in the fourth century, and was, till the twelfth, considered the most splendid church in Rome. It is on the *Viminale* and closes the view down the *Via Quattro Fontane*, the façade of the rear of the church dominating the *Piazza Regulina*. The interior, except for the addition of Ionic capitals to the columns and a profusion of tasteless decoration of the last two centuries, is much in its original condition and presents us with a noble type of the Roman basilica. The apse has some early mosaics by *Jacopo di Turriz* (12th century), and the mosaics in the upper story of the nave, above the columns, are amongst the earliest we have. The east façade by *Fuga*, in 1741, replaced that of *Eugenius III* of the 12th century, and is not only a disfigurement of the church, but was the cause of the partial destruction of one of the most precious monuments of early Italian art, the mosaics of *Duccio*, the contemporary of *Giotto* and his rival in the school of *Sienna*. They represent the dream of *S. Liberius* and the following incidents of the origin of the church. In the centre of what was left by the barbarism of *Fuga* is a mosaic by *Rusutus*, inscribed with his name, which has therefore been given to the other mosaics, but the history of the latter is clear and shows that they are the work of *Duccio*. The *Sistine* chapel near the end of the right aisle is decorated with much splendour. In front of the church stands a column from the basilica of *Constantine*, placed here by *Paul V*, crowned by a statue of the *Virgin S. Croce* in *Gerusalemme* is the fourth in importance of the basilicas and takes its name from a portion of the true cross, said to have been brought here by *S. Helena* with some of the earth of *Jerusalem*, which was mixed in the foundations of the church. It stands in the recess of the city wall to the north of *S. Giovanni Laterano*. Amongst the most important of the remaining churches are those of *S. Paolo fuori le Mura* (a short distance from the city), the most gorgeous of all the basilicas, for though in part burned in 1823 it has been restored as carefully as was possible, and probably presents an aspect not greatly differing from the original. It was erected to show the place of martyrdom of *S. Paul*, being begun in A.D. 388 by *Valentinian II* and *Theodosius*, on the site of an earlier church built by *Constantine* over the catacomb of *Lucina*, a noble lady converted to Christianity. It was completed by *Honorius* in 395, and as the restoration of *Leo III* in the 8th century changed nothing, we have in it the best representation of the ecclesiastical architecture of the 4th century still extant within the Roman system. The basilica of *S. Lorenzo*, just outside the

walls on the way to *Tivoli*, is of the highest artistic interest on account of the tombs, pictures, and architectural decorations in it. It is said to have been founded by *Constantine* about 330 A.D., enlarged by *Galla Placidia* in the 5th century, and partly rebuilt by *Pelagius II* in the 6th, and substantially altered by *Honorius III* in 1216. *S. Agnese fuori le Mura* dates from 324, and was built by *Constantine* on the spot where the body of *S. Agnes* was found. *S. Agnese*, on the *Piazza Navona*, is of the 17th century, on the site of an older church, and hardly merits a visit. *S. Agostino* (1483-1740) is noteworthy for a fresco of *Raphael* on a pilaster, but the church is so ruined by the modern restorations as to be not worth study. *Santi Apostoli*, in the place of that name, is a fine building of the 15th century, damaged by later restorations in the interior. *S. Maria di Ara Coeli* stands on the site of the Roman temple of *Jupiter (Iovis)*, and contains the figure of the infant *Christ* supposed to have miraculous virtue over sickness, for the exercise of which it is sometimes carried to the beds of dying persons, it also contains a chapel painted by *Pinturicchio*. *S. Bartolommeo all'Isola*, on the island in the *Tiber*, occupies the site of the temple of *Ascalapius*. *S. Bernardo*, on the *Piazza* of the name, and *S. Maria degli Angeli* on the *Piazza de' Terme*, are adaptations of chambers of the *Baths of Diocletian*, the latter being by *Michael Angelo*. *S. Cecilia*, in the *Trastevere*, contains the body of that saint, with a statue representing it as it was found in the catacomb where it was buried. This church interests English visitors for the tomb of *Cardinal Adam of Hertford*, who was the titular of the church (died 1398), but, though a basilica of the 9th century, has little trace of the old architecture. *S. Clemente*, on the road from the *Colosseum* to the *Lateran*, is one of the most interesting of the old churches, being built in the beginning of the 12th century by *Paschal II* over the ruins of an older church, which in its turn was erected over a temple of the divinity *Mithras*, both the older structures having been excavated in late years by the prior of the *Irish Dominicans*, to whom the church belongs. It contains the frescoes of *Masaccio* in a side chapel, and is one of the best preserved examples of the early Roman architecture, retaining some features not found in any other church. Of the early churches more or less ruined or disguised by the modern and tasteless restorations, which have, in some cases, completely hidden the old work, there are *S. Giorgio in Velabro*, *S. Balbina*, *SS. Giovanni e Paolo*, *S. Giovanni a Porta Latina*, *S. Gregorio*, *S. Lorenzo in Lucina*, *S. Maria in Cosmedin*, occupying the site of an ancient temple of *Ceres* and *Proserpine*, *S. Maria della Navicella*, *S. Maria in Trastevere*, *S. Martina*, *SS. Nereo e Achilleo*, *S. Pietro in Vincoli* (containing *Michael Angelo's* statue of *Moses*), *S. Prassede*, *S. Pudenziana*, *S. Prisca*, *Santi Quattro Coronati*, *S. Sabina* and *S. Vitale*. Of the other churches which contain works of art specially worth notice, *S. Maria in Pace* contains some of the finest of *Raphael's* frescoes, the *Trinità dei Monti* contains the *Descent from the Cross* by *Daniele da Volterra*, the pupil of *Michael Angelo*, the *Casa* is noted for its decorations and perspective ceilings, *S. Maria sopra Minerva*, for the statue of *Christ* by *Michael Angelo*, *S. Maria del Popolo* for the frescoes by *Pinturicchio*, and the *Chigi* chapel for its design and decorations by *Raphael*.

Palaces, Museums, &c.—Chief of the palatial structures of Rome is the immense pile of buildings known as the *Vatican*, forming one mass with *S. Peter's*. It comprises the old and new palaces of the *Popes*, the *Sistine* and *Pauline* chapels, the museum of antique sculpture, one of the finest in the

world, the picture-gallery, important for the quality rather than the number of the works, the Egyptian and Etruscan museums, and the library, containing some of the most important MSS in the world (See VATICAN.) The Quirinal, formerly the summer palace of the Pope, is now the residence of the King of Italy. It was begun by Gregory XIII and finished by Paul V, from designs by Fontana, Ponzio, and Maderna. Adjoining it is the Dataria, formerly the Papal chancery, now the residence of the royal household. The Lateran, adjoining the basilica of S. Giovanni Laterano, is reserved by the Italian law of guarantees to the Pope should he choose to occupy it, and the museum is under his custody, but the present Pontiff, refusing to be in any way exposed to contact with the Italian government, lays no claim to its occupancy. It was the residence of the Popes from the time of Constantine to the removal to Avignon in the 14th century. It was burned shortly afterwards, and rebuilt by Sixtus V after the designs of Fontana. It was converted by Innocent XII into an orphan asylum, and by Gregory XVI, who restored it, into a museum, comprising a department of Christian and another of pagan antiquities. In the former are the objects found in the catacombs. The palace of the Cancelleria, between the new Corso Vittorio Emanuele and the Via del Pellegrino, near the Campo di Fiori, is the only building on the left bank of the Tiber still occupied by the ecclesiastical authorities. It was designed by Bramante and is one of the finest examples of his work. Another group of palaces surrounds the Piazza del Campidoglio, the square which occupies the former depression between the two summits of the Capitoline Hill, and which is approached by a stately flight of steps from the north, at the foot of which is a pair of Egyptian lions and at the summit the antique statues of Castor and Pollux, standing by their horses, with some trophies of arms of the Roman epoch discovered in the excavations. In the centre of the square is the bronze equestrian statue of Marcus Aurelius, the only remaining complete example of the work of its class and epoch. It is said to have been preserved from the Christian iconoclasm of the early centuries by the belief that it was a statue of Constantine. On the south side of the square is the Tabularium, now converted into the palace of the Municipal Council. The present façade was constructed by Giacomo della Porta, it is said under the direction of Michael Angelo. On the s.w. is the palace of the conservatory, containing a collection of busts and a gallery of pictures. Opposite is the museum of sculpture, containing some of the most important antique statues known. The collection of pictures is not of great importance and the attributions are extremely unreliable. The general arrangement of the square is due to Michael Angelo, but the buildings were mostly prior to his time. On the west, over the so called Tarpeian Rock, is a garden, and near by the German Institute of Archaeology, as well as the palace of the German embassy, the building having been, many years ago, purchased by the Emperor William I, when Regent of Prussia.

Among the museums there are two which have been formed within the last few years. One is in the cloister and part of the rooms of the convent arranged by Michael Angelo in the ruins of the baths of Diocletian, and is devoted to the objects found in and about Rome, in the dredging of the Tiber and the excavations for the new streets, with some things found in the towns dependent on Rome. The other is in the villa of Julius III, about two thirds of a mile outside of the Porta del Popolo, devoted to the results of the excavations in the neighbourhood of the ancient Falerii, now Cività Castellana, where

the evidences of an early Greek colonization and civilization have been discovered, showing intimate commercial intercourse with Greece as early as the 6th century B.C. Falerii was one of the cities of the Etruscan League, and until these excavations were made was supposed to be an Etruscan city, but this is shown to be entirely erroneous, there being no similarity between the objects found and those peculiar to Etruscan art, while the number of vases of all kinds of pure Attic workmanship, and even signed with Greek vase painters names, is very great. The villa in which the collection is arranged was the country place of Julius Bramante and Michael Angelo having had part in the building of it, while the frescoes were done by Zuccaro, the successor of the pupils of Raphael in this kind of decoration. The museum in the baths of Diocletian contains the two bronze statues of athletes found in preparing the foundations of the monument to Victor Emmanuel, the finest examples of Greco-Roman bronze work known, and of the early empire, it also contains a fine Greek bronze Bucchus found in the Tiber, the finest Greek marble fragment ever found in the vicinity of Rome, an undecomposed life size figure, lacking head and arms, but in the highest style of Greek art, the stucco decorations of the villa found near the Villa Farnesina during the excavations for the Tiber embankment, the statues found in the house of the Vestal Virgins, a hoard of silver pence of Alfred, and other Anglo-Saxon kings, found in the same locality, and in the cloister, frescoes, mosaics, inscriptions, and many busts, statues, and architectural fragments. To this museum are to be assigned all the antiquities found in and about Rome.

The private palaces of Rome, both by their number and their magnificence, constitute one of the peculiar features of the city, and contain some of its finest collections. Of these we can mention only a few of the more celebrated. The Palazzo Barberini, on the Quirinal a little to the north east of the gardens of the Quirinal, is a large and magnificent palace. It was built by Urban VIII, a member of the Barberini family, and in its construction materials taken from ancient buildings were so largely made use of as to give good ground for the sarcastic remark, '*Quod non fecerunt barbari fecerunt Barberini*' (what the barbarians left undone has been done by the Barberini). It has a small but good collection of paintings, containing, among other works, the celebrated picture long believed to be the portrait of Beatrice Cenci by Guido Reni, but now known to have no authenticity as such. The library attached to it has numerous valuable MSS, with some other literary curiosities. The Palazzo Borghese, towards the north of the city, near the Tiber, came into the possession of the Borghese family through Paul V. It has a fine court surrounded by arcades, but is chiefly celebrated for its picture gallery. The Palazzo Colonna, about the centre of the city, begun by Martin V, has a picture gallery and a beautiful garden containing several remains of antiquity. The Palazzo Corsini, in the Trastevere, at one time the residence of Queen Christina of Sweden, who died here, has a picture gallery, garden, and collection of MSS and printed works of great value, and now with its collections belongs to the Accademia de' Lincei. The Palazzo Farnese, near the Tiber, on the right bank, a little above the Ponte Sisto, begun by Cardinal Ales Farnese (afterwards Paul III), was built under the direction of Antonio da Sangallo, Michael Angelo, and Giacomo della Porta in succession. It was inherited by the kings of Naples, but now belongs to the French government, and is occupied by the Ambassador of France to the King of Italy. The valuable antiquities it once contained are now partly in

England and partly in the Museum of Naples. The Spada Palace in the same street is one of the finest of the buildings of the late Renaissance. The Palazzo Rospigliosi, near the Palace of the Quirinal, belongs to the princes Rospigliosi of Pistoja, and contains some valuable art treasures. On the ceiling of a casino in the gardens belonging to this palace is the beautiful fresco the *Aurora* of Guido. This is now the residence of the French ambassador to the Pope. The Palazzo di Venezia, adjoining the principal Jesuit church, takes its name from having been presented to the Republic of Venice by Pius IV. With Venice it came into the possession of Austria, and is now the residence of the Austrian ambassador to the Pope. The famous Ludovisi Gardens have been cut up into building lots and mostly built over during the recent building fever in Rome. It is one of the handsomest quarters of the new city. We may likewise mention the Villa Borghese in the north, outside the walls in the park already mentioned as a favourite resort of the Romans of all classes. The principal attraction of the villa itself is the casino, now used as a museum of statuary.

Government Buildings.—As soon as Rome was seized by the Italian government instant preparations were made for transferring thither the seat of government. For this purpose ancient monasteries, such as San Silvestro, Santi Apostoli, &c. and other buildings, were converted into offices of the public departments. The former police office, originally the Curia Innocenziana, on one side of the Piazza di Monte Citorio, was converted into the chamber of deputies, and the Palazzo Madama, a little to the east of the Piazza Navona, into the senate house. The Post office occupies the ancient convent of S. Silvestro, the Ministry of Foreign Affairs the Consulta on the Quirinal, but the Home Office is in the Palazzo Braschi, and the Council of State in the Spada, both purchased by the government. The Treasury and War Office are, as before mentioned, in new buildings on the Via Venti Settembre. The Ministry of Public Instruction is in the convent of the Minerva. The Palace of Justice is a new building on the east of the Castello Sant' Angelo.

Colleges and Academies, &c.—Among these the first place is claimed by the Collegio della Sapienza, or university, a very ancient institution. Canon law and other branches of ecclesiastical learning were taught at Rome from the earliest times. To these Innocent IV., in 1244, added that of civil law, and hence the university is sometimes said to have originated at that date, but it is more correct to ascribe its foundation to Boniface VIII., who in 1303 decreed that lectures should be delivered in the four faculties of theology, law, medicine, and philosophy. A fifth was created by his successor Clement V., who founded the philological chairs of Greek, Hebrew, Arabic, and Syro Chaldaic. After the removal of the Papal residence to Avignon, which took place soon after, the new institution rapidly declined, and although attempts were made to revive it by Innocent VII. it did not regain its full vigour till the pontificate of Eugene IV. (1431-47). The most flourishing period of the university was the time of Leo X. (1513-22), under whom the building still occupied by it, near the Piazza Navona, on the south east, was begun after the designs of Michael Angelo, to whom the beautiful court is due. It was finished under Gregory XIII., under the direction of Giacomo della Porta. Attached to the university are an anatomical and a chemical theatre, and cabinets of physics, mineralogy, and zoology, as also the botanic gardens on the right bank of the river, adjoining the Palazzo Salviati, a little below the suspension bridge, and the astronomical observatory already mentioned, on

the summit of the Capitol. The university is attended by about 1000 students. The professors are paid by fixed salaries, and their lectures are gratuitous. The motto of the university, inscribed on the window above the principal entrance to the building, *Instium sapientia, timor Dei* ('the fear of the Lord is the beginning of wisdom'), is said to have given rise to the usual designation of Collegio della Sapienza. Important reforms in the constitution of the university have been made since Rome has formed part of the Kingdom of Italy. The Collegio Romano, contiguous to the church of Sant Ignazio, was formerly a Jesuit college, but is now converted into a lyceum. The building contains the Archæological Museum, founded by the learned Athanasius Kircher (died 1680). The Collegio de Propaganda Fide, situated in the Piazza di Spagna, bespeaks its nature by its name, and has acquired great celebrity as the establishment where missionaries, chiefly young foreigners, are trained to go forth for the conversion of foreign or the recovery of Protestant countries (See PROPAGANDA). The Accademia di San Luca, for the promotion of the fine arts, is composed of painters, sculptors, and architects, and was founded towards the close of the 16th century. It is in the building known as the Ferro di cavallo (horse shoe) in the Via di Ripetta. Connected with it are the schools of the fine arts, formerly located in the Collegio della Sapienza, but now taught in separate buildings. Among the other academies are the Accademia Archeologica, which has published several volumes of transactions, the Papal Accademia d'Arcadia, which under a fantastical name professed to purify the general literary taste, and has not seldom helped to corrupt it, the Accademia de' Lincei, the Italian Royal Society, now occupying the Palazzo Corsini in the Trastevere, which, founded in 1603 by Galileo and his contemporaries, is the earliest scientific society of Italy, and is still devoted to natural history and science, the Accademia Tiberina, for the promotion of historical researches, particularly in regard to Rome, and the Accademia S. Cecilia for the cultivation of music.

Hospitals and Charities.—The principal hospital, called Spirito Santo, a richly endowed institution situated on the right bank of the Tiber, combines a founding hospital (with accommodation for 3000), a lunatic asylum (accommodation for 500), an ordinary infirmary (accommodation for 1000), and a refuge for girls and aged and infirm persons. La Consolazione, the surgical hospital, on the south east slope of the Capitoline, is in a healthy situation and well ventilated. The annual mortality is only 52.5 per 1000. Among the other hospitals are San Giovanni Calabita, or Dei Fatebene Fratelli, on the island of the Tiber, only for male patients suffering from acute diseases, San Gallicano, occupying a fine building in the Trastevere, for patients of both sexes affected with cutaneous diseases, San Giacomo, near the Corso, for incurable diseases, Santissimo Salvatore, near the Church of San Giovanni in Laterano, for sick and aged females, and the Sta. Trinità de' Pellegri, near the Ponte de' Quattro Capi, chiefly for convalescents from other hospitals. Another immense establishment of considerable merit, though by no means free from blemishes, is the Hospital of San Michele, in the Trastevere, at the extreme south. It combines a house of correction for juvenile culprits and women, a house of industry for children, an asylum for the aged, and a gratuitous school of art, in which the children of the poor are taught drawing, painting, architecture, music, statuary, &c. Among other institutions called charitable are numerous societies, partly supported by government, for bestowing marriage dowries and making presents to girls

taking the veil There are in Rome 163 benevolent institutions of various kinds. The amount distributed in dowries reaches about £8000 per annum By a recent law all the hospitals and benevolent foundations are placed under one general administration, their incomes from endowments being employed by it for benevolent purposes.

Manufactures and Trade—These, if the terms are taken in their ordinary sense, are almost too insignificant to deserve special notice, although in quite recent years an improvement in this respect is discernible The chief manufactures are woollen and silk goods, velvets, hats, gloves, artificial flowers, pomatum and essences, chocolate, earthenware, musical strings, jewelry, mosaics, casts, and various objects of art, and articles connected with it The trade is chiefly in these articles, and in silks of a peculiar character, pozzuolano, olive oil, pictures, and antiques

Amusements, &c—Among these must be classed not only theatres and operas, of which there is at least an adequate number, but the endless variety of pomps and shows which are displayed on church festivals, now, however, much diminished from their ancient abundance Only those which have popular influence are retained The first place was formerly held by the Carnival, but this in late years has declined, and in spite of great efforts to make it an attraction to foreigners it retains a very poor shadow of its ancient character, and probably will be entirely abolished, as the races have been The people still observe the Ottobrate, or October festival, when the new wine can be drunk, and many gardens and restaurants outside the walls provide the occasion for festivity, not uncommonly made tragic by stabbing affrays from quarrels under the influence of the new wine.

History of the City of Rome subsequent to A.D. 476—After the overthrow of the Western Empire and the defeat of Odoacer (see ITALY—History) Rome came under the rule of the Ostrogoths Their great king Theodoric did what he could to preserve and restore the city, but it suffered severely in the wars that afterwards took place between the Goths and Byzantines, in the course of which the city was taken six times, and on one occasion the aqueducts were broken by the Goths, and on another the statues adorning Hadrian's Mausoleum were hurled down on the Goths by the Byzantines Under the Byzantines and Lombards numerous causes contributed to the decline and depopulation of Rome, but more especially inundations, famine, and pestilence in the sixth century The depredations of the Byzantine emperors as well as of the Christians, who made use of the materials and ornaments of the ancient edifices in the erection of their churches, were the cause of the destruction of many ornaments of the imperial city, but more destructive still were the feuds that afterwards (especially in the tenth century and later) raged in Rome between the leading families In 1084 a part of the Campus Martius, and most of the city in the south, were devastated by the army of Normans, Greeks, and Saracens which Robert Guiscard led to the relief of Gregory VII, then besieged by Henry IV of Germany in the Castle of Sant' Angelo In 1257 the feuds of the nobles were checked for a time by an energetic measure of the senator Brancalcione, who razed to the ground a large number of the strongholds which the nobles had occupied within the city In the following century the work of destruction and depopulation began again with the struggles which resulted from the attempt of Rienzi to found a republic (1347–54), and was continued during the period of confusion that ensued after the commencement of the great schism in 1378 The depopulation was greatly accelerated

by a terrible pestilence which raged in the city in 1348, and which is said to have reduced the number of the inhabitants to less than 20,000 A temporary check was given to the confusion that prevailed in Rome towards the end of the fourteenth century by Boniface IX, but order was not permanently re-established till 1420, when Martin V took up his residence in the city after the schism had been virtually terminated by the Council of Constance. Martin's successor, Eugene IV (1431–47), is usually named as the pope under whom the work of restoration in Rome began. In this he was followed by Nicolas V (1447–55), who began the building of the Vatican, Pius II (Æneas Sylvius, 1458–64), Paul II (1464–71), who, however, quarried in the Colosseum for the erection of the Palazzo di Venezia, as did also Paul III (1534–50), when building the Palazzo Farnese. But the most important period in the architectural history of modern Rome was the end of the fifteenth and beginning of the sixteenth centuries, when the labours of Bramante, the two Sangalli, Peruzzi, and Michael Angelo were pursued under the patronage of Sixtus IV, Alexander VI, Julius II, and Leo X, and when the works of the great architects were adorned in the interior by artists as great or greater, such as Raphael and Michael Angelo himself The injury caused by the sack of Rome by the imperial army under the Constable of Bourbon in 1527 affected rather the property of the inhabitants than the public edifices The works of art that suffered most on this occasion were the frescoes of the Vatican From this date onwards the city began to extend more and more over all parts of the Campus Martius Much was done in the sixteenth century, especially by Paul III, Pius IV, Gregory XIII, and Sixtus V, for the embellishment and enlargement of the town, the improvement of the streets, and the restoration of the fortifications Many remains of antiquity were then rescued from destruction, although many more were sacrificed, particularly under Sixtus, for the sake of modern structures In the buildings of this period (as in those of Fontana, died 1607) a deterioration of taste begins to manifest itself, and this becomes still more marked in the works of his successors, Maderna (died 1629) and Bernini (died 1680) In the eighteenth century Benedict XIV, Clement XIV (founder of the Museo Pio Clementino), and Pius VI deserve special mention for their efforts to preserve and beautify Rome In 1798 Rome was occupied by the French, and deprived of many of its art treasures At the same time a republic was erected in Rome, but this only lasted for a short time, and after a series of disturbances and changes the pope was again reinstated in his dominions (See ITALY) From 1809 to 1814 Rome was once more under French rule, the States of the Church having in the former year been annexed to the Napoleonic empire During this period important excavations were made, principally in the Forum of Trajan and within the arena of the Colosseum The short-lived Roman Republic of 1848–49 passed a resolution for the complete excavation of the Roman forum, but it only resulted in the removal of the rows of trees that adorned it Not a little was done, however, in the way of excavation and investigation both above and below ground (see CATACOMBS) by the Papal government after its re-establishment in 1850 On the 20th of September, 1870, the Italian troops, after effecting a breach in the Porta Pia, in the north east of the city, marched in along the Via di Porta Pia (henceforth called Via Venti Settembre) Since then Rome has been in the possession of Italy, and since the 1st of July of the following year, the capital of the kingdom The general result of the occupation

of Rome by the Italian government may be summed up in a great improvement in the sanitary conditions, greater safety to the person, and an enormous increase of population, along with the destruction of the former character of the city, the addition of new quarters in the most detestable taste, and an immense increase in the cost of living, resulting in the loss of the most characteristic portion of its society, painters, poets, people of leisure who came for its quiet and its associations. It is now a modern city with very few of the old attractions and still fewer new. Pop. in 1860, 184,050, in 1871, 219,608, in 1881, 273,268, in 1901, 463,000.

ROMAN ERA and CALENDAR. See CALENDAR and EPOCH.

ROMAN LANGUAGE. The language of the Romans was the Latin, or that dialect of Italy which was spoken in the plain lying between the sea, the Tiber, and the Sabine Mountains, and extending towards Campania on the south. Like most languages of Europe it is a branch of the Indo-European family of languages, and is more closely allied to the Greek than to any other member of the family. The oldest remains of the language consist of a few fragments of sacred songs (hymns of the Salii), legal formulas (from the Laws of the Twelve Tables), and some inscriptions on tombs, votive offerings, &c. From these it is seen that during its early history, before it obtained a literary cultivation, the Latin language lost some of the strength of its vowel and consonantal sounds, but not to the same degree as the neighbouring Italic dialects. This weakening took place especially in the final syllables, final vowels being shortened and final consonants dropped. This process began to be checked about the middle of the third century B.C., when the literary cultivation of the language commenced. The metrical productions of this period tended to preserve the language in all the strength and richness that it yet retained, and helped to restore decayed forms, and this tendency was assisted by the increasing practice of political eloquence. The application of the Greek metrical laws to the Latin language by Plautus, Ennius, Attius, and Lucilius made it necessary for these writers to endeavour to develop and perfect the forms of that language. To Plautus the language was chiefly indebted for the improvement of its vocabulary and the determination of the modes of expression, while the other three poets mentioned devoted their attention mainly to the orthography and grammar of the language. Meanwhile the domain of the Latin tongue had been greatly extended by the foundation of Roman colonies in various parts of Italy, and the admission of numerous Italian towns into the Roman state, until in the time of Sulla, in consequence of the granting of full rights of citizenship to all the Italians, and of the introduction into all the towns of Italy of the Roman system of municipal legislation, the whole peninsula began to use the Latin language. The Etruscan, Umbrian, and Oscan died out completely, and only in Lower Italy the Greek language continued to be spoken alongside of the Latin. Soon after this the language attained, through the arts of rhetoric and poetry, its highest development in the classical literature of the Ciceronian and Augustan eras, and this development was again greatly promoted by the attention that some of the leading writers (Cicero, Varro, Caesar) bestowed upon the theory of grammar. What the language now lost in its vocabulary through the rejection of archaic forms and words was more than compensated by the additions that Cicero made to it through the formation of hosts of new words from native sources, but sometimes also from the Greek, to express philosophical ideas. At the same time the language gained in

refinement and regularity, while it preserved all its peculiar force and majesty. The unavoidable introduction of Greek terms at this period was betrayed by the adoption of three new letters of the alphabet from that language, *z*, *y*, *z*, besides the aspirates *ch*, *ph*, *rh*, *th*. Cicero and Virgil soon came to be recognized as the authorities for literary speech, but the resources of the language were increased in the years succeeding them by the adoption of new words from the provinces which were so rapidly Romanized in the first century of our era, and by the constant creation of new words by composition and derivation. The classical period of the Latin language ends in the second century. The decline may be said to date from the time of Hadrian (117-138), when the language began to be disfigured by the revival of a number of antique pre-Ciceronian words and expressions, and by the adoption of numerous Grecisms. In the third century the deterioration of the language proceeds at a very rapid rate. The linguistic sense seems then to have totally disappeared. The language of the common people in town and country (*sermo vulgaris*, *plebeus*, *rusticus*) forces its way into literature, provincialisms and Grecisms become more common, since there was neither an established literary tradition nor a cultivated society to check this corruption. In the fourth and fifth centuries a certain degree of purity is indeed found in some writers, but this was the result of study, and was totally unlike the living language of the day. The popular speech, no longer restrained by the influence of a more cultivated language, now experienced, as we learn from the inscriptions of the period, that series of vocal transmutations and changes in the vocabulary and grammar which formed the transition to the Romance languages. Latin, however, still remained, through the influence of the church and the law, the literary language till far on in the middle ages, but it was a Latin largely intermixed with Celtic, Teutonic, and later also Romance elements, and now usually called Monkish or Middle Latin. It continued to be the language of diplomacy as late as the seventeenth century, and it has not even yet altogether ceased to be the language of the learned, being regarded by many as the most suitable international language of linguistic research.

The structure of the Latin language began to be systematically studied in the period between the second and third Punic war. A Greek ambassador of Attalus, king of Pergamus, Krates Mallotes, being detained in Rome by an accident, passed his time in preparing a grammar of the Latin language, but nothing more is known of this production. The first Roman who wrote upon the grammar of his own tongue was M. Terrentius Varro, and from him downwards numerous names of Greeks and Romans who applied their labours to this subject are mentioned. (Compare the collections of the *Grammatici Latini* by Lindemann, Keil, and others.) The terminology of the system of these grammarians was translated word for word from that devised by the Stoic and Alexandrine grammarians of the Greek language. The arrangement of the accidence in the grammars of these early writers on the subject was adhered to by Donatus in the fourth and Priscian in the fifth or sixth century, and is essentially the same as that still followed. The syntactical part of Latin grammar and the theory of Latin style are creations of modern times. Among the modern grammars of the Latin language those of Zumpt (translated into English by Schmitz), Madvig (the original in Danish, but translated into German by Oppermann, and from German into English by Woods), H. J. Roby (two vols.), Donaldson, Kennedy (Public School Grammar), &c. In recent times, since the rise of comparative

philology, much light has been shed on the relations of Latin to the other members of the Indo European family of languages, by the works of Bopp, Schleicher, Pott, Fick, Brugmann, &c., besides such special works as Lindsay's *The Latin Language an Historical Account of Latin Sounds, Stems, and Flexions*, Wharton's *Etyma Latina*, Breal and Bailly's *Dictionnaire Etymologique Latin*, Corssen's *Ueber Aussprache, Vocalismus, und Betonung der lateinischen Sprache*. Among dictionaries of the Latin language may be mentioned those of Facciolati and Forcellini (Latin-Latin, with English explanations and equivalents, by Bailey, London, 1828), Freund (Latin German), and the Latin English dictionaries of Smith, Andrews, White and Riddle, and Lewis and Short, the last the most recent and complete. Those of Smith, Andrews, and Lewis and Short are avowedly based on that of Freund. A great *Thesaurus Linguae Latinae*, in the preparation of which many scholars are co-operating, was begun to be published in 1900, and will practically be exhaustive of the subject. Among aids to the study of the early forms of the Latin language are the *Corpus Inscriptionum Latinarum* of Ritschl, Mommsen and Henzen, and Wordsworth's *Fragmenta and Specimens of Early Latin*.

ROMAN LITERATURE—The history of Roman literature is generally divided into four periods—1 From the earliest times till Cicero (died 43 B.C.) 2 Till the death of Augustus (A.D. 14), usually called the *golden age* 3 Till the death of Trajan (A.D. 117), called the *silver age* 4 Till the subjugation of Rome by the Goths (A.D. 476), called the *brass age*.

Poetry in this language, as in all others, preceded prose. The oldest forms of Latin poetry were the *Fescennine verses* which were poems of a jocular and satirical nature sung at marriages and country festivals, satires or improvised dialogues of miscellaneous contents and various form, and the *Atellanæ fabula*, a species of grotesque comedy supposed to resemble the modern *Punchinello* or *Pulcinello*. The verse used in these early attempts was called the *Saturnian*, and was of very simple structure, consisting merely of a certain number of rhythmical rises and falls. None of these early forms of poetry were fixed in writing, however, till they had been exalted by the introduction from the Greek of a more elaborate and artistic versification. The most ancient literary monuments of the Latin language that have been preserved are a few religious formulas and hymns or fragments of hymns, such as those of the *Salii* or priests of Mars, and the *Arvales Fratres*, one of whose hymns was discovered at Rome in 1778, fragments of laws, especially those of the twelve tables, the *Annales Maximi*, or yearly chronicles kept by the *pontifex maximus*, some of the private chronicles of the leading houses, which were afterwards, to a great extent, embodied in the history of Rome, and lastly, some of the more artistically composed sepulchral inscriptions, the oldest and most celebrated of which are those of the *Scipios*, which reach as far back as the beginning of the third century before Christ. But Latin literature, properly so called, did not take its rise till the Romans came under Greek influence. About 240 B.C. *Livius Andronicus*, a Greek captive of Tarentum, exhibited at Rome a drama translated from the Greek, and subsequently brought forth a translation of the *Odyssey*. He was followed by *Nævius*, who wrote a historical poem on the first Punic war, besides dramas, the two tragic writers *Pacuvius* and *Accius* or *Attius*, and by *Ennius*, author of eighteen books of metrical annals of Rome and of numerous tragedies, and regarded by the Romans themselves as the founder of Roman poetry. The founder of Roman comedy was *Plautus*, who

was surpassed for force of comic humour by none of his successors. Next followed *Cæcilius*, and then *Terence*, a successful imitator, often mere translator, of Menander and others, and, although an African by birth, remarkable for the purity and excellence of his Latinity. These three comic writers took the new comedy of the Greeks as their model (*Comædia palliata*). On the other hand, *Afranius*, with a few others, introduced Roman manners upon the stage (*Comædia togata*). Soon after him *Lucilius* discovered a talent for satire, in the later sense of the term. This was the only kind of literary composition among the Romans which was of native origin, and *Lucilius* himself is usually regarded as the founder of it. Among dramatic writers *Laberius* and *Syrus* are mentioned at a somewhat later period as celebrated authors of mimes, but these were a kind of performances that scarcely rose to the level of even the rudest comedy, but consisted mainly in mimicry. (See *MIMÆ*.) *Lucretius* a writer full of strength and originality, was the author of a philosophical poem after the system of *Epicurus*, in six books, entitled *De Rerum Natura*. *Catullus* was distinguished in a different department—in lyric poetry, in elegy, and in epigrams. He had much real wit and delicacy of feeling, but, like most of the amorous and satirical poets of the ancients, paid too little regard to decency of expression. To the same period belonged *Cassius Parmenius*, who wrote tragedies, epigrams, and elegiac poems, and is favourably mentioned by *Horace*.

With the age of Augustus, and the loss of liberty, a new spirit appeared in Roman literature. Augustus himself and *Mæcenas* were the patrons of poetic talent. The first of the poets thus patronized is *Virgil*, the greatest of the epic poets of Rome, author of *Eclogues* or pastoral poems after the manner of *Theocritus*, the *Georgics*, a didactic poem having agriculture for its subject, the most finished of his works, and a heroic poem entitled the *Æneid*, which the poet was prevented by death from revising and retouching in the way he no doubt intended to do. Contemporary with him was *Horace*, the favourite of the lyric muse, and also eminent in satire, in which branch he was the successor of *Lucilius*. In the Augustan age *Propertius* and *Tibullus* are the principal elegiac poets. In *Propertius* a certain dignity appears in the midst of his habitual sensuality, although he was often forced in his thoughts and expressions. *Tibullus* was much purer and more graceful, and to him *Quintilian* adjudges the first place among elegiac poets. Along with the self-flourished *Ovid*, a prolific and sometimes exquisite, but too often slovenly poet. Of the other poets belonging to this age there is little to be said. Some esteemed elegiac writers, such as *Pedo Albinovanus* and *Cornelius Gallus*, are almost entirely lost to us. To the same age we may assign *Phædrus* the fabulist, who has more merit in regard to style than invention, since he usually followed Greek originals, and was always most successful when he did so. A poem upon *Ætæa*, attributed to *Cornelius Severus*, who is praised by *Quintilian*, has little inventive power, and the didactic poem of *Gratius Faliscus* upon the chase (*Cynegeticon*), and that of *Manilius* upon astronomy, some passages excepted, are more valued for their materials than their manner, which, though inferior, resembles that of the productions of the Alexandrian school of Greek poetry. During the age of Augustus the writing of tragedies appears to have been a fashionable amusement, and *Asinius Pollio*, *Varius* (author of *Thyestes*), and *Ovid* (author of *Medea*), were among the tragic writers of the period. A few fragments of the *Thyestes* are all that has come down to us of their works in this department. On the Roman stage

tragedy never flourished, and the causes of this are not difficult to divine. We need only remember the kings led in triumph and left to perish in prison, the gladiatorial games, and the combats of wild beasts. Among a people who took delight in such scenes we could not expect to find a relish for the more refined excitement of tragic spectacles. See DRAMA.

In the third age, from the death of Augustus to that of Trajan, the department of poetry in which greatest excellence was reached was satire, and the most distinguished satirists were Persius, and after him Juvenal, both of whom expressed, with unrestrained severity, their indignation at the corruption of the age. In the other principal writers of the later poetry—Lucan, who returned to the historical epic in his *verification* of the civil war between Cæsar and Pompey, and the bombastic Statius, who wrote the *Thebaid* and the beginning of the *Achilleis*, in verse, to say nothing of the minor poets—we find a universal barrenness of invention and a coldness which vainly endeavours to kindle itself and its hearers by the fire of rhetoric. These poets had long since lost all poetic feeling, and even the love of republican freedom. With such a corrupt taste as that of the Romans, poets like the pompous Statius, or the wanton epigrammatist Martial, to whom we cannot deny wit and fertility of invention, could alone be successful. Lucan, however, with all his defects of plan and unworthy adulation, sometimes exhibits great elevation of sentiment, vigour of expression, and a happy delineation of character. Valerius Flaccus, who described the Argonautic expedition in verse, in imitation of Apollonius Rhodius, endeavoured to shine by his learning rather than by his originality and freshness of colouring, and Silius Italicus, a great admirer of Virgil, who selected the second Punic war as the subject of a heroic poem, is merely a historic poet. To this age belong the ten tragedies under the name of L. Annaeus Seneca. They were not intended for the stage, for which they are wholly unfitted, being rather declamatory and sententious poems than dramas. Here also we may mention the *Satyricon* of Petronius, a contemporary of Nero, for although this work, a kind of comic romance in which the author depicts with wit and vivacity the corruption and bad taste of the age, is written mainly in prose, it is interspersed with numerous pieces of poetry, and cannot be classed with any other prose work belonging to Roman literature.

In the fourth period Roman poetry sunk to a still lower state. The forty-two fables of Avianus or Avianus are in a stiff and forced style, on the other hand, the poem of Nemesianus (flourished 283), on the pleasures of the chase (*'yneyetica*), and the seven eclogues of Calpurnius, have some pretensions to purity and ease. Ausonius, in his epigrams and idyls (so called), and particularly in his poems on the Moselle, forms as it were the line of division between the ancient and the modern world. Claudian (flourished about 400) appears almost a miracle in this brazen age. Although not free from rhetorical and epigrammatical excrescences, and from the desire of displaying his learning, he is still far above his age, and often approaches to a graceful style. We conclude this part of the subject with Rutilius Numatianus (flourished in the beginning of fifth century), whose voyage to Gaul, in elegiac measure, is not without merit, and two Christian poets, Prudentius and Sedulius (both of whom lived in the fourth century), in whose writings we find hardly anything but modern features and the first germs of the church songs.

In the Roman prose literature, which is, on the whole, of a higher character than the poetical, eloquence, history, philosophy, and jurisprudence are

the principal departments. Of the Roman orators we know many merely by name and by the reputation which they enjoyed. To this class belong Cornelius Cethegus, Tiberius Gracchus, Cotta, Sulpicius, but particularly Lucius Crassus, Antonius, Hortensius and even Cæsar himself. Cicero not only acquired the most splendid fame in eloquence, the finest models of which we possess in the orations of his yet extant, but also appears as a teacher in his rhetorical works, and in general had a most important part in founding Roman prose literature. In the age of Augustus political eloquence necessarily ceased, yet some of the works of this, and even of later periods, were more or less imbued with the old spirit. The panegyric of Pliny the younger upon Trajan may be considered as the last note of Roman eloquence: the author was distinguished in Rome as a forensic orator. The declamations (*controversiæ* and *suasoriæ*) of Marcus Seneca, of the time of Augustus, must also be named under the head of eloquence, although they are of little value. We can best judge of the fallen state of eloquence by examining the works of Fronto, and later orators (the panegyrists), in imitation of Pliny, Quintilian, a contemporary of Pliny, and a theoretical writer on the subject of rhetoric, is to be regarded as the last stay of the art. With the rhetoricians may be classed the grammarians, a few of the chief of whom will be found mentioned at the end of the section on the Roman language.

The first historical writings were merely chronicles (*fasti*), containing the names of the chief magistrates for each year, along with a statement of the most important events of the year. Such were the *annales maximi* kept by the high-priest (pontifex maximus), upon a tablet in his house, and the *libri lintei*, or chronicles written upon linen, preserved in the temple of Juno Moneta. Fabius Pictor, Albinus Posthumus, the elder Cato, Cælius Fannius, Valerius Antium, were among the first Roman historians, but had no pretensions to skill in the historical art. Great authors first appeared in the most splendid age of Roman literature. The spirit, the beautiful simplicity and the judicious style of Julius Cæsar, in his *Commentaries* on the Gallic and Civil Wars, carried on by himself, have always been admired. The style of Sallust is sometimes forced, but he displays great care in his narrative and in his delineation of character, with such richness of thought and depth of observation, that he may not disadvantageously be compared with his model Thucydides. If we except the lost universal history of Trogus Pompeius, who also belonged to the age of Augustus, Livy embraces the widest field among the Roman historians, and he deserves to be called perfect in narration and style. Cornelius Nepos, with his lives of distinguished generals, stands next to these models of historical writing, at least for purity of style. Under the oppression of despotism, even history, which had hitherto been so well sustained by the Romans, degenerated: this appears from the forced and declamatory style of Velleius Paterculus, (time of Tiberius), from whom we possess a short sketch of Roman history, in which he indulges in the grossest flattery. Valerius Maximus, a contemporary of Paterculus, in his memoirs of memorable men, is a mere compiler and collector of anecdotes. Florus (time of Trajan and Hadrian) is still more to be condemned: he wrote an abridgment of Roman history, but his style is bombastic, and his adulation disgraceful. Suetonius, who lived about the same time, besides his rhetorical and grammatical works, wrote the lives of the emperors, which are interesting from their contents. Along with these two lived Tacitus, the greatest of all the Ro-

man historians, remarkable both for his depth of thought and power of condensed expression. It may be said, with truth, that in him the poet, the philosopher, and the historian are united. After him we meet no great Roman historians, though in the fourth century there were several who must be at least named. Eutropius, Aurilius Victor, author of a work on the origin of the Roman people, Ammianus Marcellinus, and perhaps also Justin (who may be earlier), the abridger of Trogus Pompeius. The six authors of the imperial history (*Scriptores Historiæ Augustæ*), Spartianus, Capitolinus, Trebellius, Vopiscus, Gallicanus, and Lampridius, who lived in the reigns of Diocletian and Constantine, deserve little praise. Gaius and Ulpian are important names among writers on law.

The Romans distinguished themselves in philosophy only by spreading the doctrines of the Greek philosophers in their own language, and the most eminent statesmen, in the most flourishing periods of Rome, were friends and admirers of philosophy. Of the lofty spirit of Lucretius we have already spoken, but Cicero, by the introduction of the more elevated moral philosophy of the Greeks, rendered the most important service to the intellectual cultivation of his countrymen. He did not wander in the labyrinths of speculation, but he clung to philosophy in prosperity and adversity, and took delight in expounding this favourite theme. His works also afford much information in regard to the history of ancient philosophy, for example, his *Tusculan Questions*. Philosophy always found admirers at Rome, and almost every school had its adherents there, but it was more the subject of discussion in the schools and in the world than of literature. The Old Academy and the school of Epicurus were at first the most popular, but oppression turned men to Stoicism, which influenced some of the poets, as Lucan. The philosopher L. Annæus Seneca, probably the same with the dramatist already mentioned, by whom, besides other works, we possess twelve philosophical treatises, is distinguished for his artificial subtleties and glittering antitheses, but his writings, though on the whole dull, contain many excellent thoughts finely expressed. Apuleius, who flourished in the latter half of the second century, wrote on philosophy and rhetoric, but is more famous for his satirical romance *The Golden Ass*, containing the charming story of Cupid and Psyche. Aulus Gellius, a writer of the same century, has left us a valuable miscellany in his *Noctes Atticæ* (*Attic Nights*).

Roman literature contains some excellent examples of the epistolary style. The letters of Cicero are mostly addressed to the greatest men of his age on passing events, and are written with purity, elegance, and simplicity. They contain authentic materials for the history of the time. The letters of Pliny the Younger are written with taste and elegance, and give us a pleasing picture of their author and of his relations with the emperor Trajan, Tacitus, and others of his contemporaries, while throwing much light on Roman life and society. The letters of Annæus Seneca to Lucilius relate chiefly to the philosophical system of the Stoics, and are more worthy of attention for their matter than their manner, which partakes of the common faults of his style. We may also notice the letters of Symmachus, about the end of the fourth century, and those of the still later Sidonius Apollinaris, who was also known as a poet. The former are not unsuccessful imitations of Pliny the Younger, the latter are marked by the faults of their age, but are interesting for their contents.

The Roman mythological writers derived their

matter mostly from Greek sources, and have little that is peculiar or original. The Roman worship was in some measure similar to that of the Greeks, and the heroic mythology of the Greeks having been introduced into Rome by the poets, was in a manner adopted by the Romans, although it had no connection with the national traditions. Ovid in his *Metamorphoses* and *Fasti* gives us many tales connected with the mythology current in his time. An author named Hyginus, whose age we cannot accurately determine, left a collection of mythological stories. A poetical astronomy of the same author illustrates the constellations celebrated in poetry.

Pomponius Mela (flourished under the Emperor Claudius in the first century) is one of the few Roman writers worthy of being mentioned as geographers. He gives us a brief account of the world as known to the Romans of his day, written in good Latin, but unfortunately too much in the form of a catalogue. Tacitus, who described ancient Germany, may be included under this head.

Physicians were first esteemed among the Romans after the time of Cæsar and Augustus, and the eight books of Celsus (time of Augustus and Tiberius) on medicine, which form only a part of a large encyclopædia, are very important, both on account of their contents and their style. We also possess some unimportant treatises on medicine by Scribonius Largus (time of Claudius) and Marcellus Empiricus (end of fourth century), and there is still extant a poem on this subject by Scribonius Sammonianus, a favourite of the Emperor Septimius Severus.

Several agricultural works of the Romans are entirely lost to us. There is still extant a work on agriculture which bears the name of Cato the Elder (second century before Christ), and the three books of the learned Varro (first century B.C.) on husbandry are very important and instructive. The works on agriculture of Columella (first century A.D.) and Palladius (probably belonging to the early part of the third century) are partly written in verse, and deserve commendation.

Pliny the Elder, who belonged to the first century (after Christ), wrote a work on natural history, in which he at the same time treated of cosmography and geography, medicine and the arts, with great erudition, but in a stiff style. He has given us an example of what the Romans might have done, with their great advantages, for the extension of human knowledge. Marcianus Capella, in the fifth century, wrote in somewhat barbarous language and in equally bad taste a sort of encyclopædia dealing with the various branches of polite learning—a work very popular in the Middle Ages.

We have still left unmentioned Vitruvius (time of Augustus), author of a work on architecture, valuable as a compendium of those of the Greek architects, Frontinus (died about 106), author of a treatise upon aqueducts, Vegetius (fourth century), a writer on the art of war, Julius Obsequens, author of a treatise on prodigies (early third century), and Firmicus Maternus (beginning of fourth century), a writer on astrology. A miserably written work on the art of cookery bears the name of the notorious gourmand Apicius, but this name was probably adopted to give the work a wider circulation.

Before the end of the period a considerable body of Christian literature, written in Latin, was in existence, and we may particularly mention the *Vulgate*, St Jerome's version of the Scriptures. St Ambrose and other fathers of the Church also made use of Latin in their writings, and the names of Tertullian, Cyprian, Arnobius, and Lactantius may also here be recorded. Boethius author of the

famous Consolations of Philosophy, so popular in the Middle Ages, may be regarded as in some respects linking the classical period with the succeeding. Among works on the literature of Rome are Teuffel, *History of Roman Literature* (from the German, two vols.), Simcox, *History of Latin Literature* (two vols.), Cruttwell, *History of Roman Literature*, Sellar, *The Roman Poets of the Republic*, *The Roman Poets of the Augustine Age*, Virgil, and Horace and the *Æliac Poets*.

ROME, a city of the United States, one of the capitals of Oneida county, New York, on the west bank of the Mohawk River, at the junction of the Black River and Erie Canals, 109 miles W N W of Albany. Its streets are wide and well shaded with maples and elms. Rome contains a handsome court house, many churches, a high school, a Roman Catholic academy, free library, deaf mute institute, &c. The manufactures include machinery, locomotives, puddled and railroad iron, farm implements, &c. Pop (1880), 12,194, (1890), 14,991.

ROME COUNCILS OF. Innumerable ecclesiastical councils have been held at Rome, but the only ones that need be noticed are the six general or a universal council here enumerated, the five first being called Lateran councils, from being held in the Lateran. See LATERAN.

1 The ninth council, the first of the Western Church, held under Calixtus II, between 18th of March and 5th of April, 1123. The principal business was the confirmation of the concordat of Worms. See CONCORDAT and INVESTITURE.

2 The tenth council, held in April, 1139, under Innocent II. Its principal acts were the excommunication of the supporters of lay investiture and the condemnation of Manichæism and the doctrines of Arnold of Brescia.

3 The eleventh council, held under Alexander III, in March, 1179. It authorized the war against the Albigenses, regulated the election of the pope, and pronounced the condemnation of simony.

4 The twelfth council, held by Innocent III in November, 1215. It condemned the doctrines of the Manichæans, Albigenses and Waldenses and prohibited the establishment of new religious orders.

5 The nineteenth council convoked by Julius II, July 18, 1511, met under the same pontiff, May 3, 1512, concluded under Leo X., March 16, 1517. It is celebrated for the (temporary) overthrow of the liberties of the Gallican Church, through the condemnation of the pragmatic sanction of Charles VII of France, and the conclusion of the concordat between Francis I and Leo X. (See GALICAN CHURCH.) By some historians this council is not regarded as a general one.

6 The council of the Vatican, the twenty-second general council, was held in the pope's palace of the Vatican, in the north west of Rome, under Pope Pius IX., between December 8, 1869, and October 20, 1870. Its principal act was the declaration of the infallibility of the pope by vote of the 18th of July, 1870. See VATICAN and COUNCIL.

ROMILLY, SIR SAMUEL, an eminent lawyer, was the son of a jeweller, of French extraction, and was born in London on March 1, 1757. He received a private education, was placed in a lawyers' office, and then entered Gray's Inn to study for the bar, to which he was called in 1783. For some years his practice was chiefly confined to draughts in equity, but he gradually rose to distinction in the Court of Chancery, in which he ultimately took the lead. His general politics agreeing with those of the Whigs, he was during the short administration of Fox and Lord Grenville (1806) appointed solicitor general (being member for Queenborough), and knighted

When his party went out of office he remained in Parliament, where he became distinguished by his talent in debate, and particularly by the eloquence with which he pleaded the necessity of a revision of the criminal code, with a view to the limitation of capital punishment, and a more appropriate regulation of the scale of penalties. On this subject he also composed a very able pamphlet—*Observations on the Criminal Law of England* (1810), and to his exertions may be traced the final determination of the executive to the reform and condensation of the various acts in regard to crime effected under the superintendence of Sir Robert Peel. He also published *Objections to the Creation of a Vice Chancellor* (1813). He was in favour of Catholic emancipation and other reforms, and was in the height of popularity and reputation when grief at the death of his wife deprived him of reason, and in a fit of temporary frenzy he committed suicide, November 2, 1818. A collection of his speeches, with a Memoir of his Life, was published in 1820. *Memoirs of his Life* written by himself, with a Selection of Correspondence, edited by his sons, appeared in 1840.

ROMORANTIN, a town of France, in the department of Loiret Cher, agreeably situated on the Saultre, at the junction of the Morantin, 25 miles south east of Blois. It has important manufactures of broad cloth and other woollen goods, several spinning mills and tanneries. Pop (1896), 6780.

ROMSEY, a municipal borough of England, in Hampshire, 8 miles N W of Southampton, on the river Test. The chief building is the fine old abbey church, restored in 1892. It is mainly in pure Norman style, but there are Early English and later additions. The town hall contains a public library. There is also a corn exchange. Tanning, brewing, boat building, jam making, and paper making are the chief industries. Pop (1891), 4276, (1901) 4365.

ROMULUS, the mythical founder and first king of Rome, said to have been the son of Sylvia, generally, but incorrectly, called Rhea Silvia, a daughter of Numitor, king of Alba, and one of the priestesses of Vesta. She was devoted to the service of Vesta by her uncle Amulius who had deprived her father of his throne, and killed her brother and wished to prevent her from having posterity who might dispossess him of his usurped crown. By the god Mars she became the mother of male twins, who immediately were ordered by Amulius to be thrown into the Amo. Happily the river had at that time overflown the surrounding country, and the basket containing the two boys, Romulus and Remus, was stranded at the foot of the Palatine Hill. Here a she wolf, going down to the water to drink, was attracted by their cries, carried them to her cave, and suckled them, while a woodpecker brought them whatever other food they needed. Sometime afterwards chance brought thither Faustulus, the king's herdsman who took them home and educated them. With him Romulus and Remus spent their youth. When they had grown up the herdsmen of their foster father had a quarrel with those of Numitor, and Remus was taken prisoner. His courageous brother collected a small band of enterprising companions, with whom he not only freed his brother, but, on being made aware by Numitor of his parentage and the wrongs of his family, likewise deprived Amulius of his usurped throne, and reinstated his old grandfather Numitor in his dominions. After the termination of this exploit Romulus, in connection with his brother, resolved to build a city. In order to determine the site, and to decide which of the brothers should give his name to the city, they consulted the augurs. Romulus wished to build it on

the Palatine, Remus on the Aventine, or on another hill three or four miles down the Tiber. Each took his station on his favourite hill, the night passed away, and at the first streak of dawn Remus saw six vultures, but at sunrise, when this news was brought to Romulus, twelve vultures flew by him. Each claimed the augury in his favour, but as their companions decided for Romulus his brother was forced to yield. Romulus now proceeded to mark the boundary of the city, he yoked a bullock and a heifer to a plough, and marked a deep furrow round the base of the Palatine, and guided by this line they began to raise the wall. Remus, who still resented the defeat he had suffered, leaped over the rude ramp in scorn, whereupon the enraged Romulus slew him. According to another tradition Remus fled from the anger of his brother beyond the Alps, and founded Rheims. Romulus was immediately struck with remorse, and could obtain no rest till he appeased his brother's shade by instituting the festival of the Lemuria for the souls of the departed. Thus is Rome said to have been founded in the year 753 (or according to others 752 or 751) B.C. The small number of friends who had followed Romulus were by no means sufficient to people his city, he saw himself therefore compelled to make it a place of refuge for every houseless exile. Men enough were thereby gained, but the Roman citizens soon wanted women, and their proposals for the daughters of the neighbouring cities were rejected by the fathers of the maidens, who looked with an envious eye on the increase of this city. On this account Romulus instituted a religious festival, to which he invited the Sabines with their wives and daughters. They came, but in the midst of the festival the unarmed strangers were suddenly attacked, and deprived of their wives and daughters, and every Roman hastened to provide himself with a female companion. The two states thus became engaged in war, but the entreaties of the ravished females, who threw themselves between the contending parties, at length effected a peace, and Rome gained by her union with the Sabines an important addition. Many successful wars, which always ended in additions of population and territory to the infant state, confirmed and extended its power. Romulus was strict and arbitrary, too much so perhaps for his subjects, and his sudden disappearance naturally excited the conjecture that he fell by the hand of a malcontent. According to tradition he ascended to heaven into the company of the gods, after he had completed the work of founding the eternal city, and, until the introduction of Christianity, Rome worshipped its founder in temples expressly dedicated to him. It is likewise possible that he was struck by lightning, for his disappearance is said to have happened during a thunderstorm, while he was without the city, near the marshes of Caprea, reviewing his army. See **ROME**.

ROMULUS AUGUSTULUS, the last of the Roman emperors of the West, was the son of Orestes, who seized the reins of government after having driven out the Emperor Julius Nepos, 475 A.D. Orestes declined assuming the purple himself, but invested his son with it, still, however, retaining the real sovereignty in his own hands. In the following year the power of Orestes was overthrown by Odoacer (see **ODOACER**), who defeated his rival at Pavia, and put him to death. Romulus was spared on account of his youth, beauty, and innocence, but was exiled to the villa of Lucullus, on the promontory of Misenum in Campania. There he lived upon an annual allowance of 6000 pieces of gold till his death, the date of which is unknown.

RONA, the name of an island in the Inner Hebrides, between the Isle of Skye and the mainland,

about 4 miles long, and about 1 mile broad. It is extremely barren, and of repulsive aspect, its greatest elevation is about 500 feet. A few black cattle are reared on its patches of mountain pasture. Pop 181.

RONALDSHAY, North and South, two of the Orkney Islands, the former the most northerly, and the latter the most southerly of the group. North Ronaldshay, separated from Sanday by North Ronaldshay Firth, which, where narrowest, has a breadth of 3 miles, is of very irregular shape, about 5 miles long by 3 miles broad, and has an estimated area of 4 square miles. The surface is generally flat, with a gentle rise towards the centre, and with the exception of a small strip in this direction, and another round the shore which pastures sheep, is fertile and well cultivated. At the north of the island there is a magnificent lighthouse, about 150 feet high, conspicuous from almost every part of Orkney. Besides cultivating their small crofts the inhabitants are engaged in fishing. Pop 501.—South Ronaldshay, separated from the mainland on the south by the Pentland Firth, which, between its southern extremity and Duncansby Head, is about 6 miles wide, and from the Island of Burray on the north by a narrow channel called the Water Sound, has a length, N.N.W. to S.S.W., of about 8 miles, with a medium breadth of little more than 2 miles. The coast is much indented, particularly on the north west, where a deep winding bay forms what is called Widewall Harbour. The prevailing rocks are composed of massive sandstone and dark blue slate or pavement. Much of the land is well cultivated, let out in small crofts at pretty high rents, but the inhabitants depend chiefly on the productive cod and herring fishing. Tumuli and Picta houses are met with. Pop (1891), 2315.

RONCESVALLES (French, *Roncesvaux*), a valley in Navarre, between Pampluna and St Jean de Port, where, according to tradition, the rear of Charlemagne's army was defeated by the Arabs in 778, and the brave Roland killed. The battle forms an essential part in the fabulous cycle of Charlemagne (See **ROLAND** and **ROMANCE**). The chief place of the valley, called also Roncevalles, is traversed by the so called Gates of Roland, leading over the Pyrenes to France, and in the church of the little place fabulous antiquities bearing the name of Roland are shown. The French under Moncey here defeated the Spaniards in 1794, and Soult took a strong position here in 1813, from which Wellington drove him.

RONDA, a town in Spain, Andalusia, 40 miles west of Malaga, on a lofty rock overhanging the Guadalevin or Guadiaro, here crossed by two bridges. It is accessible only by a narrow ascent, formerly guarded by a castle, which was blown up by the French in 1812, and consists chiefly of an old Moorish town with narrow tortuous lanes and partly of a modern quarter of a better description. Among the buildings are an old Moorish palace communicating with the river below by a cylindrical staircase of 365 steps, and a bull arena substantially built of stone. The manufactures are hats, cordovan and sole leather, linen and woollen cloth, gloves, soap, glue, starch, guitar strings, chocolate, and earthenware, and the trade, in addition to some of the above manufactures, is chiefly in fruit. Pop (1887), 18,350.

RONDO (Italian), or **RONDFAU** (French), originally a short lyric of thirteen lines divided into three unequal strophes, the two or three first words form the burden, and are repeated after the eighth and thirteenth line. The term is now chiefly applied to a musical composition, vocal or instrumental, generally consisting of three strains, the first of which closes in the original key, while each of the others is so constructed in point of modulation as to recon-

duct the ear in an easy and natural manner to the first strain. The *rondo* takes its name from the circumstance of the melody *going round* after both the second and third strain to the first strain, with which it is finally closed. It frequently forms the last movement of a sonata or a symphony, but is very common as a separate composition.

RÖNNE, a town and seaport of Denmark, capital of the Island of Bornholm. It is defended by batteries, has a good school, several building yards, in which a good many vessels are built, a harbour with $11\frac{1}{2}$ feet of water, and a considerable trade. The greater part of the inhabitants are sailors or fishers. Ronne is the residence of the governor of the island, and the seat of its principal courts and offices. Pop (1890), 8281.

RONNEBURG, a town of Saxe-Altenburg, 14 miles south-west of Altenburg. It is a place of some strength, is walled, and defended by two forts. It contains a castle, church, and bathing establishments, and has manufactures of flannel and merino, two tile works, and several mills. Pop (1895), 6195.

RONSARDI, PIERRE DE, an early French poet who contributed to the improvement of the language and literature of his country, was born at the Château de la Poissonnière in Vendôme, 11th September, 1524. Having finished his education, he entered as page the service of the dauphin, and then of the Duc d'Orléans, second son of the king. In 1538 he accompanied James V of Scotland and his bride Marie de Lorraine back to their kingdom, and remained at the Scottish court three years. He also spent six months at the English court, and on his return from his travels was employed in a diplomatic capacity in Germany, Piedmont, Flanders, and Scotland. On his return to France he found himself afflicted with deafness, which compelled him to abandon the diplomatic career, and he devoted himself with great eagerness to the study of literature. The poets of Greece and Rome received much of his attention, but above all he strove to invest the poetry of France with a classic dignity and grace, and in his works we begin to trace clearly for the first time in French literature the influence of the renaissance. In the *Floral Games* at Toulouse he triumphed over his competitors, and received a silver statue of Minerva, which he presented to Henry II. He was greatly esteemed by that prince, and by his successors, Francis II and Charles IX., obtained the abbey of Bellozane, and was also prior of St Cosme, near Tours, where he died in 1585. His writings, consisting of sonnets, madrigals, eclogues, lyric pieces, elegies, and satires, and a fragment of an epic poem, *La Franciade*, were read with an almost incredible admiration by his contemporaries, and brought the lucky poet valuable presents from Queen Elizabeth of England and the imprisoned Queen of Scots. Many of his sonnets and odes possess considerable merit, but his style is marred by affectation, and his pages are taken up with too many freshly imported words from the classic languages.

ROOD, a measure of surface, the fourth part of an acre, equal to 40 square poles or perches, or to 1210 square yards.

ROOD. A crucifix or image of Christ on the cross, with the images of St John and the Virgin Mary, sometimes also with that of a saint, was so called in the old churches of England. The place where the rood was elevated was called the rood loft, which was generally placed over the chancel-screen in parish churches. They were all ordered to be taken down in 1548, but were restored for a short time under Queen Mary. The screens dividing the choir from the naves of most of our cathedrals are old rood lofts from which the images have been removed.

ROOF. See ARCHITECTURE and CARPENTRY.

ROOK (*Corvus frugilegus*), a species of Conirostral Insessores included in the sub-family of the Corvinæ or True Crows, in which group the upper mandible is not toothed, and its ridge is more or less curved. The wings are long and somewhat rounded, the tarsi being covered with transverse scales, and the two lateral toes being of equal size. The Rook possesses its distinctive characters in the base of the bill being naked, as well as the forehead and upper part of the throat. These parts in the Crow are feathered. In the young Rook, however, feathers exist at the base of the bill, but disappear on the bird attaining the age of one month. The Rook possesses a voice much less harsh in its character than that of the Crows, and whilst the latter are solitary birds the Rooks are gregarious in habits, and frequently build their nests near the dwellings of man. The nests are built or repaired early in March, and the young are hatched in April. The food consists chiefly of grubs, although grain appears to form part of the dietary. The Cockchafer's larvæ are said to form a favourite diet of the Rook. In Britain the Rook is a permanent resident. In other parts of Europe these birds appear to be migratory in habits, whilst they are said not to occur in Spain. The nests are generally built on the tops of trees. The eggs are five in number, and are coloured bluish green, with dark spots or patches. The male and female alternately sit upon the eggs. These birds sometimes produce white or piebald varieties.

ROOKE, SIR GEORGE, an English admiral, descended of an ancient family in the county of Kent, was born in 1650. His strong predilection for a seafaring life induced him at an early age to enter the royal navy, in which he rose to the highest situations. His conduct in several naval expeditions under King William and Queen Anne placed his name high in his profession, especially the gallantry which he displayed in the destruction of the French and Spanish fleets in Vigo Bay (1702), and the capture of Gibraltar in July, 1704. On the 9th of the following August he fell in with a French fleet of much superior force, under the Comte de Toulouse, off Malaga, and a bloody engagement, which lasted nearly the whole day, ensued. Victory remained with the English, who lost 2000 men against a loss to the enemy of 3000, but not one of the French ships was captured. Sir George occupied a seat during several parliaments for Portsmouth, and another at the council board of the lord high admiral, Prince George of Denmark. His votes on several occasions, particularly one in favour of Harley as speaker of the House of Commons in 1701, obscured his merits in the eyes of the court party, the value of his services was depreciated, and his good fortune ascribed to accident. He at length retired from the service in disgust to his family seat in Kent, where he died in 1709. See Campbell's *Lives of the Admirals*.

ROOT, in arithmetic and algebra, denotes any number or quantity which, by successive multiplications into itself, produces powers. Thus 2 is a root of 4, 8, 16, because $2 \times 2 = 4$, $2 \times 2 \times 2 = 8$, $2 \times 2 \times 2 \times 2 = 16$. The power is named from the number of the factors, and the root is named from the power. Thus if a quantity be multiplied once by itself, the product is called the second power or square, and the quantity itself the square root or the second root of the product, if multiplied twice we have the third power or cube, and the quantity is the cube root or third root, and so on, the fourth root is the biquadrate. Beyond this the roots are commonly called the fifth, sixth, &c., roots. The algebraic sign of root is $\sqrt{\quad}$, and the fourth root of 16, equal to 2, is written thus $\sqrt[4]{16} = 2$. The same is the case with algebraic magnitudes, as—

$\sqrt[2]{(a^2 + 2ab + b^2)} = a + b$. To extract the given root of mathematical expressions is one of the most important of mathematical operations.

ROOT, in philology See **ETYMOLOGY** and **PHILOLOGY**.

ROOT, of plants. See **BOTANY**.

ROPE-MAKING A single thread of yarn, consisting of fibres twisted together, has a tendency to untwist itself, the external parts being strained by extension, and the internal parts by compression, so that the elasticity of all the parts resists, and tends to restore the thread to its natural state. But if two such threads similarly twisted are retained in contact at a given point of the circumference of each, this point is rendered stationary by the opposition of the equal forces acting in contrary directions, and becomes the centre round which both threads are carried by the forces which remain, so that they continue to twist round each other till the new combination causes a tension capable of counterbalancing the remaining tension of the original threads. Three, four, or more threads may be united nearly in the same manner. A *strand*, as it is called by rope-makers, consists of a considerable number of yarns thus twisted together, generally from sixteen to twenty-five, a *hawser* consists of three strands, a *shroud* of four, and a *cable* of three hawsers or shrouds. Shroud laid cordage has the disadvantage of being hollow in the centre, or else of requiring a great change of form in the strands to fill up the vacuity, so that in undergoing this change the cordage stretches and is unequally strained. The relative position and the comparative tension of all the fibres in these complicated combinations are not very easily determined by calculation, but it is found by experience to be most advantageous for the strength of ropes to twist the strands, when they are to be compounded, in such a direction as to untwist the yarns of which they are formed, that is, to increase the twist of the strands themselves, and probably the greatest strength is obtained when the ultimate obliquity of the constituent fibres is least and the most equable.

A very strong rope may also be made by twisting five or six strands round a seventh as an axis. In this case the central strand or heart is found, after much use, to be chafed to oakum. Such ropes are, however, considered unfit for rigging, or for any use in which they are liable to be frequently bent.

Ropes are most commonly made of hemp, but various other vegetables are occasionally employed. The Chinese even use woody fibres, and the barks of trees furnish cordage to other nations. A great modern improvement is the introduction of ropes made of wire (which may or may not be galvanized) for the standing rigging of ships and other purposes.

The first part of the process of rope making by hand is that of spinning the yarns or threads. The spinner carries a bundle of dressed hemp loosely gathered round his waist, the two ends of the bundle being in front of him. He draws out a proper number of fibres with his hand, twists them with his fingers, and fixing this twisted part to the hook of a whirl, which is driven by a wheel put in motion by an assistant, he walks backwards down the rope-walk, the twisted part always drawing out more fibres from the bundle round his waist. He must take care that these fibres are equally supplied, and that they always enter the twisted parts by their ends, and never by their middle. When he reaches the end of the walk a second spinner takes the yarn off the whirl, and gives it to another person to fix upon a reel, while he himself attaches his own hemp to the whirl hook, and proceeds down the walk in the same way as his predecessor. When the person at

the reel begins to turn, the first spinner holds his yarn firmly at the end, and advances slowly up the walk while the reel is turning, keeping it equally tight till he reaches the reel, where he waits till the second spinner takes his yarn off the whirl-hook, and joins it to the end of that of the first spinner, in order that it may follow it on the reel. The next part of the process is that of warping the yarns, or stretching them all to one length, which is about 200 fathoms in full length rope grounds, and also in putting a slight turn or twist into them. The third process is the tarring of the yarn. Sometimes the yarns are made to wind off one reel, and having passed through a kettle of hot tar, are wound upon another, the superfluous tar being removed by causing the yarn to pass through a hole lined with oakum, but the ordinary method is to tar it in skins or hanks, which are drawn by a capstan with a uniform motion through the tar kettle. Great care must be taken that the tar is boiling neither too fast nor too slow. Yarn for cables requires more tar than for hawser-laid ropes, and for standing and running rigging it requires to be merely well covered. Tarréd cordage has been found to be weaker than what is untarred when it is new, but it is not so easily injured by water. The last part of the process of rope making is to lay the cordage. For this purpose two or more yarns are attached at one end to a hook, the hook is then turned the contrary way from the twist of the individual yarn, and thus forms a strand, three strands, sometimes four, besides a central one, are then stretched at length, and attached at one end to three contiguous but separate hooks, but at the other end to a single hook, and the process of combining them together, which is effected by turning the single hook in a direction contrary to that of the other three, consists in so regulating the progress of the twists of the strands round their common axis, that the three strands receive separately at their opposite ends just as much twist as is taken out of them by their twisting the contrary way in the process of combination.

Large ropes are distinguished into two main classes, the *cable laid* and *hawser laid*. The former are composed of nine strands, namely, three great strands, each of these consisting of three smaller secondary strands, each formed with an equal number of primitive yarns. A *cable laid* rope 8 inches in circumference is made up of 333 yarns or threads, equally divided among the nine secondary strands. A *hawser laid* rope consists of only three strands, each composed of a number of primitive yarns proportioned to the size of the rope, for example, if it be 8 inches in circumference it may have 414 yarns equally divided among three strands, thirty fathoms of yarn are reckoned equivalent in length to 18 fathoms of rope cable laid and to 20 fathoms hawser laid. Ropes of from 1 to 2½ inches in circumference are usually hawser laid, of from 3 to 10 inches are either hawser or cable laid, above 10 inches they are always cable laid. Such is the ordinary process of rope making by hand, but machinery has long been in use for making ropes, by means of which they are produced with greater equality and better finish, and the long rope walk dispensed with. The merit of effecting such an improvement is due to Captain Huddart, whose laying machine carried his inventions in this department to great perfection, and has formed the basis of most subsequent improvements. The following are Captain Huddart's improved principles of the rope manufacture.—1 To keep the yarns separate from each other, and to draw them from bobbins revolving upon skewers so as to maintain the twist while the strand or primary cord is forming. 2 To pass them through a register, which divides them by circular shells of holes, the number in

each concave shell being conformable to the distance from the centre of the strand and the angle which the yarns make with a line parallel to it, and which gives them a proper position to enter 3 To employ a tube for compressing the strand and preserving the cylindrical figure of its surface 4 To use a gauge for determining the angle which the yarns in the outside shell make with a line parallel to the centre of the strand when registering, because according to the angle made by the yarns in this shell the relative length of all the yarns in the strand will be determined 5 To harden up the strand, and thereby increase the angle in the outside shell, which compensates for the stretching of the yarns and the compression of the strands By Huddart's machines the strands receive that degree of twist only which is necessary, and are laid at any angle with the greatest regularity, the pressure being so regulated as to give the desired elasticity, and all parts of the rope are made to bear equally A great many patents have been obtained and worked of late years, with various degrees of success, for making ropes

Wire ropes are made of a certain number of wires twisted into the requisite number of strands, and are now extensively used in the rigging of ships, as well as for cables, being also employed for various other purposes For greater flexibility hempen cores are used, thus, for instance, we may have a rope of six strands round a hempen core, each strand consisting of six wires around a smaller hempen core Steel wire makes a considerably stronger rope than iron wire Such ropes are extensively employed in raising material from mines, in suspension bridges, for traction in tramways and railways, in steam ploughing, and various other purposes Coir ropes (that is, ropes made of cocoa nut fibre) are much used on board ships, since, though not so strong as ropes of hemp, they are not injured by the salt water The strongest ropes of vegetable material are those made of the fibre named abaca or Manila hemp, obtained from a species of plantain or banana

ROQUEB, SAN, a town of Spain, in Andalusia, 7 miles north of Gibraltar, the loss of which fortress induced the Spaniards to build it in 1704 Pop (1887) 8793

ROQUEFORT a village of Southern France, department of Aveyron giving name to a well known variety of cheese that is largely made in its vicinity from cow milk Pop (1896) 855

RORAIMA a celebrated mountain of South America, in lat 5° N in Venezuela, near the boundary of British Guiana It is 8740 feet high, the top forming a rugged rocky plateau and has steep rocky sides, rendering the summit almost inaccessible This was first reached in 1881 by Mr Feyerard in Thurn The flora and fauna of the summit are rather scanty

RORQUAL (*Balaenoptera*) a genus of Whales included in the family of the Balaenidae or Whale bone Whales, and distinguished as a genus by the moderate size of the swimming paddles or flippers and by the possession of a soft or adipose dorsal fin The Rorquals are included among the so called 'Furrowed Whales', which are so named from the furrowed or plated appearance of the skin, the baleen or whalebone plates being short and of comparatively little commercial value Other names of the genus are *fin whale* and *razor back* The smallest species is the Lesser Rorqual (*Balaenoptera rostrata*), and the largest is Sibbald's Rorqual (*B Sibbaldi*), which is certainly the largest known living animal Specimens of this Rorqual have been found of the length of 120 feet, but the average length is about 80 feet The colour is a dark gray, marked with bluish gray tints The body is long, and of comparatively slender conformation, this character,

together with the presence of the dorsal fin, serving to distinguish it from the Greenland or Right Whale (*Balena mysticetus*), for which it has been sometimes mistaken The head, also, is not so much arched as that of the latter form, and the mouth cavity is of larger size The under surface of the jaw and anterior part of the body are deeply plated with longitudinal foldings of the skin The baleen or whalebone is short, and the plates do not average more than 4 feet in length Over 5000 plates of this substance are said to be contained within the mouth of the Rorqual, although, as already remarked, it is too short and coarse to be of value

The Rorqual differs widely in habits from the more valued and esteemed Greenland whale The Rorquals inhabit waters free from ice, and when engaged in 'spouting' or 'blowing' they swim quickly through the water, instead of resting, as is the custom of the Right Whales The food consists of fishes, as well as the small molluscs (Pteropoda) and Medusæ which form a part of the dietary of most Cetaceans The cod forms a chief part of the food of the Rorqual, and shoals of these and of other and smaller food fishes—such as herrings, pilchards, &c—are followed by this whale with unremitting vigour The eagerness of its pursuit, indeed, sometimes proves fatal to it for it frequently strands itself in the shallow waters into which it has followed its prey

When struck by the harpoon, the Rorqual exhibits a greater fierceness and boldness in its movements than other species of whales These animals thus generally dive with such speed and force on being struck that the harpoon line has, in the majority of instances, to be at once cut to avoid accident and disaster The Rorqual has also been known to suddenly turn against the whaling boats, and to dash them in pieces by strokes of the powerful tail The blubber—the only valuable part of this animal—averages about 6 or 8 inches only in thickness, and not more than 10 or 15 tons of oil can at the best be obtained from an average specimen Frequently a much less quantity is extracted The Rorqual from its habits, is well known on the British coasts, and many examples have from time to time been procured through these animals stranding themselves on the shores Specimens of this whale are common in museums, and the measurements of one specimen—the skeleton of which is now preserved in the National Museum of Science and Art at Edinburgh—gave a length of 95 feet, and a weight of 219 tons The breadth was 18 feet, the head measuring 22 feet in length The skeleton alone weighed 35 tons The Laplanders value these animals exceedingly, as affording them materials for many purposes of their primitive mode of life, the bones, blubber, skin, and viscera being all utilized by that people The common Fin whale or Rorqual (*B musculus*) is abundant in the seas of northern Europe and America, and is occasionally seen in the Mediterranean *B borealis* is a rarer species

ROSA, MONTE (the ancient *Mons Sylvestris*), a mountain of the Pennine Alps, on the frontiers of the Swiss canton of Valais and Piedmont, and, after Mont Blanc, the loftiest mountain in the Alps, its chief summit (Dufourspitze) being 15,217 feet above sea level It is about 40 miles farther to the east than Mont Blanc, which also belongs to the Pennine Alps, and is no great distance south east of the Matterhorn (See ALPS) It is formed by the union of several mountain ridges Where the ridges meet four chief angles are formed, the one on the north east which is most precipitous, inclosing the glacier of Macugnaga, another on the north west originating the great Gorner glacier or glacier of Zermatt, a third on the south west containing the glacier of

Lys, and the fourth on the south-east occupied by several large but less prominent glaciers. The loftiest peak was first ascended in 1855. There are three other peaks, respectively 15,132, 15,005, and 14,965 feet high.

ROSA, SALVATOR, a celebrated painter, distinguished likewise as a musician and a poet. He was the son of an architect and surveyor, and was born at the village of Renella, near Naples, on June 20, 1615. He was intended for the church, but at the age of sixteen, leaving, of his own accord, the seminary in which he had been placed for education, he devoted himself to the study of music, and with such success that he became a skilful composer. His eldest sister having married Francesco Francanzano, a painter of considerable talent, Salvator, from frequenting his work room, acquired a predilection for the art, in which he afterwards excelled. But his taste was formed more from the study of nature among the wilds of the Apennines than from the lessons of other artists, and he delighted in delineating scenes of gloomy grandeur and terrible magnificence to which the boldness of his conception and the fidelity of his representations communicate a peculiar degree of interest. During one of his mountain rambles he was seized by brigands, and as the story runs, would have been put to death but for the intercession of a female who had at once fallen in love with the handsome young painter. He is said to have associated with the brigands for some time, but he at last got tired of such a life, escaped, and went to Naples, where he worked in obscurity till one of his pictures was observed by the famous painter Lanfranco, who generously recommended Salvator to notice, and procured him effectual patronage and support. He removed to Rome where he established his reputation, and raised himself to celebrity and independence. In 1647 we find him fighting under Masaniello, on the ruin of whose cause he returned to Rome, where he was not however, permitted to remain. He went to Florence, where he was patronized and employed by the grand duke and other members of the family of Medici. At length, returning to Rome on the death of his enemies, he painted many pictures for the churches in that city, where he died on Mar 15, 1673. He is especially distinguished as a painter of landscapes and battles. Among his extant works are Prometheus, St. John the Baptist, Belshazzar, The Philosopher, A Satyr, St. Roche Wounded, some landscapes and battle scenes, in Rome, Jesus disputing with the Doctors, St. Francis di Paula, Daniel in the Lions' Den, Jesus walking on the Water, in Naples, Souls in Purgatory, in Milan, Conspiracy of Catiline, Diogenes breaking his Cup, and his own portrait, in Florence, The Soldiers of Gideon, Bandits in Council, St. Jerome in the Desert, and some landscapes, in Munich, Mercury and the Woodman, Tobias and the Angel, River Scene, Landscape with Figures, in the National Gallery, Moses at the Rock, Halt of the Soldiers, at Hampton Court, Prometheus, Sisyphus at the Hague, A Monk in Meditation, at Rotterdam, Regulus, Cadmus at Copenhagen, The Prodigal Son, Nausicaa, Soldiers playing at Dice, in St. Petersburg, The Angel Raphael and The Young Tobias, The Shade of Samuel appearing to Saul, in the Louvre, Jesus in the Garden of Olives, Resurrection of Christ, in Toulouse. His satires and other poems have been often printed.

ROSACEÆ, the Rose family, a natural order of herbaceous plants, shrubs, and trees, with alternate simple or compound leaves accompanied at their base by two persistent stipules. They have a calyx of one sepal, with four or five divisions, and the corolla

has as many petals as the calyx has divisions, but is sometimes wanting. The stamens are generally very numerous and distinct, and are inserted with the petals round the ovary. The pistil presents various modifications. Sometimes it is formed of a single carpel or several entirely free and distinct carpels, placed in a tubular calyx. Sometimes these carpels adhere by their outer side to the calyx, sometimes they are united, not only to the calyx but to each other, and sometimes they are collected into a kind of capitulum or head. The fruit also is very various, and the modifications of this part afford the chief distinguishing marks of the sub orders into which this extensive order has been divided. In Engler and Prantl's *Pflanzenfamilien* the Rosaceæ are divided into thirteen tribes, and these tribes are grouped in six sub orders. The sub order Spiræoidæ comprises the tribes Spirææ (queen of the meadow), Quillajæ (soap tree) and Holidiscæ. The tribe Pomoidæ (apple, pear, &c.), forms a sub order by itself. Under the sub order Rosoidæ are classed the tribes Kerriæ (*Kerria japonica*), Potentillæ (raspberry, straw berry, &c.), Ceroocarpiæ, Ulmaricæ, Singuorbiæ (lady's mantle, &c.), and Rosæ (roses). Neuradoidæ, Prunoidæ (sloe, &c.) and Chrysobalanoidæ (coconut plum), are tribes each of which constitutes a sub order. The plants belonging to this order are chiefly found in the cold and temperate climates of the northern hemisphere, though some inhabit high mountains within the tropics, and a few are found even in warm regions. Many of our commonest edible fruits belong to this order, such as strawberries, raspberries, brambles, plums, apples, quinces, cherries, almonds, peaches.

ROSAMOND commonly called 'Fair Rosamond', was the daughter of Walter Lord Clifford became the mistress of Henry II., and died probably between the ages of thirty and forty about the year 1176. According to the popular legend she was introduced to the king's notice by the collusion of her brothers, who hoped to advance their own fortunes by means of her extraordinary beauty. The king is said to have set apart for her residence a building surrounded by a labyrinth at Woodstock, where he frequently visited her. The intrigue was finally discovered by the jealous Queen Eleanor, who forced her to drink poison. These details however have no historic basis. She was buried in the chapter house of Godstow nunnery, where her tomb was long to be seen.

ROSANILINE, the base of magenta, fuchsin, &c. Rosaniline is a colourless substance, having the formula $C_{20}H_{12}N_6$, its crystalline salts are many of them very brilliant colours. See MAGENTA.

ROSARIO, a town of the Argentine Republic, in the province of Santa Fe, on the right bank of the Paraná, 170 miles N.W. of Buenos Ayres. It stands about 60 feet above the river, which is navigable up to the town for vessels of large burden, and it has regular communication with Buenos Ayres by steam-vessels. A railway has been made from Buenos Ayres to Rosario, and thence to Tucuman, opening up, with the main line and branches a vast extent of territory. Rosario has been greatly improved in recent years, the streets being paved or macadamized, and some of them planted with trees, a fine broad boulevard constructed round the town, many handsome buildings built (including new courts of justice, theatre, banks, hotels, &c.) recreation grounds laid out, a water supply and drainage works being provided, and tramways being laid in all the chief streets. The telephone is extensively in use. The facilities for loading and discharging cargoes have been much increased recently, and further improvements are projected. The exports in 1900, chiefly wheat, hay, maize, hides, timber, linseed, wool, and

sugar, were valued at over £5,850,000 Pop (1882), 32,204, (1900), 112,461

ROSARY (Latin, *rosarium*), among the Catholics a devotional practice which consists in reciting fifteen times the Paternoster or Lord's Prayer and 150 times the Ave Maria or angelical salutation, with a doxology at the end of every tenth. As the computation is made by means of beads, the string of beads used for this purpose has acquired the popular name of a rosary. It is instituted in honour of the fifteen principal mysteries of Christ and of the Virgin Mary. The rosary or triple chaplet, in its present form, was introduced by St Dominic in the first half of the thirteenth century, but the use of beads as a means of reckoning the number of repetitions of a certain prayer is of far higher antiquity. The rosary consists of fifteen times ten small beads for the Aves, every ten beads being preceded by a larger one for the Paternoster. The name *rosarium* is probably derived from the appellation *Rosa Mystica*, by which the Virgin Mary, to whose glorification the rosary is devoted, is frequently dedicated in the common prayers of the church, others have derived the name from the rosewood of which the beads were formerly made. They are now made of various materials, berries, wood, ivory, metal, stone, &c., and are often of exquisite workmanship and great intrinsic value. They are blessed for the use of the people by the popes, by bishops, by superiors of religious orders, and others who have special authority to do so. In honour of the victory obtained over the Turks at Lepanto (October 7, 1571) Pope Gregory XIII., in 1573, instituted the festival of the rosary, which is annually solemnized on the first Sunday of October. Pope Clement XI. extended this festival through all the Catholic part of Western Europe in honour of the victory gained over the Turks at Peterwardein (August 5, 1716). The Buddhists and the Mohammedans make use of a similar string provided with beads for saying their prayers. The string of the Mohammedans has ninety nine small beads, which they, in their prayers, drop through their fingers one after the other, while they recount the ninety nine qualities of the Deity mentioned in the first part of the Koran. Their beads are generally made of holy earth from Mecca or Medina.

ROSCILLIN See **NOMINALISM**

ROSCIUS, QUINTUS, the most celebrated comic actor at Rome, was a native of Solonium, near Lanuvium. His extraordinary histrionic powers procured him the favour of many of the Roman nobles, and among others of Sulla, who presented him with a gold ring, the symbol of equestrian rank. He enjoyed the friendship of Cicero, who in his early years received instruction from the great actor, and who ever afterwards spoke of him in terms of admiration and affection. At a later time the orator and actor used to try which of them could express a thought with the greatest effect, the one by his eloquence and the other by his gesticulation. These contests, we learn from Macrobius, impressed Roscius with so high an idea of his art that he wrote a book comparing eloquence and acting. He was considered to have reached such perfection in his profession that the Romans were in the habit of calling every man who was successful in his own peculiar art by the name of Roscius. He realized an enormous fortune by his acting, Macrobius sets down his daily gains at 1000 denarii (about £35), and Pliny states that his annual profits amounted to 50,000,000 sesterces (over £400,000). There is extant the fragment of an oration by Cicero, in which Roscius is defended from a claim of 50,000 sesterces brought against him by C. Fannius Chærea. The date of this great actor's death is not quite certain, probably about 62 B.C.

ROSCOE, THOMAS, son of William Roscoe, born near Liverpool, June, 1791, died at London 24th September, 1871, well known as an author, translator, and editor. In 1823 he published translations of Sismondi's *Literature of Southern Europe*, with a life of the author, and *Memoirs of Benvenuto Cellini*, in 1828 a translation of Lanzi's *History of Painting in Italy*, in 1839 *Life and Writings of Cervantes*. He edited the *Novelist's Library*, with critical and biographical notices (sixteen vols. 12mo, 1831-33), and translated a series of novels from the Italian, Spanish, French, and German, besides writing several books of travel in Wales, Italy, France, Belgium, &c.

ROSCOE, WILLIAM, the well known author of the *Lives of Lorenzo de' Medici and Leo the Tenth*, was born near Liverpool 8th March, 1753. His father was a publican and market-gardener. After receiving the rudiments of education at a common school he had about three years' experience as a salesman of vegetables, the produce of his father's garden, in the Liverpool market. At the age of sixteen he was articled to an attorney in Liverpool, and this obliged him to study the Latin language, but he did not confine himself to what was necessary to his profession, by dint of hard study he read and made himself master of the most distinguished Latin classics. He next studied the Italian and French languages, and in the former he became uncommonly proficient. He still found time to attend to his business, and to peruse the English poets. Having finished his clerkship, he was taken into partnership by Mr. Aspinall, an attorney of considerable practice, and he carried on the whole of the business, to which he paid a strict attention. During this period he contracted a friendship with Dr. Enfield and Dr. Aikin. Painting and statuary were also objects of his attention, and in 1773 he read, at the society in Liverpool, an ode on those subjects, and also sometimes read lectures there. In 1777 he published a collection of some of his earlier poems. When the question of the slave trade was brought before the public Roscoe took a warm part in favour of the abolition, and most cordially joined Clarkson in his endeavours. He also wrote a reply to a Spanish Jesuit on that subject. His *Scriptural Refutation of a Pamphlet on the Licitness of the Slave Trade*, and his *Wrongs of Africa*, appeared in 1788, and in 1796 he brought out the work which has gained him so much celebrity, the *Life of Lorenzo de' Medici*, called the *Magnificent* (two vols. 4to, 1795). This work has gone through several editions, and has been translated into Italian, French, and German. About the year 1797 Roscoe retired from the practice of an attorney, and entered himself as a student of Gray's Inn, with a view to the bar. During this period he had leisure for other studies, and published the *Nurse*, a poem, from the Italian, and wrote the *Life and Pontificate of Leo X.* (four vols. 8vo). Though the *Life of Leo* is not equal to his *Lorenzo*, it is a composition which displays talent and extensive research. From 1806 to 1807 he represented Liverpool in parliament. He had some time before entered into business at Liverpool as a banker, a step which eventually landed him in great pecuniary difficulties. He died 30th June, 1831. Roscoe was the author of several political pamphlets, and the great mover and supporter of several public works in Liverpool. To the botanic garden and to the Athenæum he lent much effective assistance. His *Life and Correspondence* were published (1833, two vols. 8vo) by his son, Henry Roscoe.

ROSCOMMON, an inland county of Ireland, in the province of Connaught, bounded north by Sligo and Leitrim, east and south by Leitrim, Longford,

Westmeath, King's County, and Galway, west by Galway and Mayo. Greatest length, 60 miles, breadth, 40 miles. Area, 607,691 acres, of which about one fifth is under tillage, more than a half under pasture, one sixth being waste, bog, mountain, &c., whilst nearly 30,000 acres are under water. Roscommon is drained by the Shannon, and contains several lakes. The surface is undulating or flat, except towards the north, where the Curlew Mountains lie, near Sligo, and the Braulieve, near Leitrim. The highest summits in the county attain an elevation of 1000 feet to 1200 feet. The Curlew Mountains consist of the Old Red Sandstone formation, the Braulieve or Braughlieve of shales and sandstone, with three beds of coal resting on beds of the Millstone grit series. The level parts of the county are for the most part occupied by the formations belonging to the great Carboniferous Limestone district of Central Ireland, and these parts are very fertile. Limestone abounds, and is quarried for building, coal and iron have been wrought, but not to much advantage. Potter's clay and pipe clay are found in various places. The principal crops are oats and potatoes. The pastures are luxuriant, and the breeds of cattle and sheep good. The linen manufacture is now nearly extinct. The county returns two members to Parliament. Principal towns—Roscommon, Boyle, Castleress, and Elphin. Pop (1881), 132,490, (1891), 114,397, (1901), 101,639.

ROSCOMMON, a market and corporate town in Ireland, capital of the above county, 96 miles west by north of Dublin. It has a spacious court house and jail, an infirmary and fever hospital, a hosiery factory, a small military barrack, constabulary head quarters, and a trade in grain. Here are the remains of an abbey founded in 1257, and of a magnificent castle of nearly the same period. The town gives the title of earl to the Dillon family. Pop of town (1881), 2117, (1891), 1994.

ROSE (*Rosa*), a genus of plants, type of the order Rosaceæ, with the following characters: shrubs, erect, climbing, or creeping, deciduous or evergreen, mostly with thorns on the stems, petioles, &c., leaves alternate, compound, imparipinnate (simple in *R. persica*), stipulate, flowers generally large and beautiful, often fragrant, solitary or in terminal corymbs, red—white—yellow, receptacle pyriform or spherical, narrowed at the throat, with a circle of glands, bearing petals, sepals, and stamens on its edge; calyx of 5 (rarely 4 or 6) sepals, corolla of 5 (rarely 4 or 6) petals, alternate with sepals, stamens numerous, with slender filaments and introrse anthers, converted into petals in cultivation (double), carpels numerous, distinct, inserted on base of receptacle, ovaries each with 1 pendent ovule, styles distinct or mutually adherent, stigmas capitate, fruit (hip) multiple, consisting of an enlarged, fleshy, coloured receptacle enclosing the hard achenes, seeds exalbuminous, with fleshy embryo. The species are very numerous and often difficult to distinguish satisfactorily, but at least one hundred may be considered as undoubtedly true species. They are found in all parts of the north temperate zone, and even in elevated tropical regions, but are entirely wanting in the southern hemisphere. They may be classified thus: Sub-genus *Hulthemia*, with only one species, *R. persica* (leaves simple), sub-genus *Eurosa*, including all the other species, and comprising four sections: section I, Suberectæ (upright shrubs, styles distinct, stipules usually adnate), the most important, including the Dog Rose (*R. canina*), a wild British species, section II, Bracteatæ (styles distinct, stipules almost free, bushy species, with woolly fruits), section III, Banksianæ (styles distinct, stipules almost free, climbing species, with glabrous

fruit), section IV, Systylæ (creeping and climbing species, styles united), including, for example, the British *R. arvensis*. From the stand point of the horticulturist, roses are classified according to habit, time of flowering, fragrance, and similar characters. The chief classes and varieties of summer roses are as follows: Provence Roses, derived from *R. centifolia*, comprising the Cabbage Rose, &c., Miniature Provence or Pompon Roses, of low growth, suitable for edgings and pots, Moss Roses, with a moss like growth on the calyx, a sport from *R. centifolia*, Damask and French Roses, derived from *R. damascena* and *R. gallica* respectively, including York and Lancaster, &c., Alba Roses, with glossy foliage, from *R. alba*, Hybrid Chinese, Hybrid Bourbon and Hybrid Noisettes, from the Provence and French, crossed with the Chinese, Bourbon, and Noisette kinds, &c., Scotch or Burnet Roses, suitable for low hedges, derived from *R. spinosissima*, a British species, Austrian Brier Roses from *R. lutea*, Double Yellow Rose from *R. sulfurea*, not suited for Britain, Eglantine Roses, from *R. rubiginosa* alone or by crossing, Boursault Roses, from *R. alpina*, Ayrshire Roses, from a variety of *R. repens*, alone or by crossing with *R. indica* &c., Evergreen Roses, from *R. sempervirens*, Multiflora Roses, from *R. multiflora*, *R. indica*, &c., including Polyantha Perpetuals and Fairy Roses, Hybrid Climbing Roses from *R. moschata* and *R. multiflora*, and Banksian Roses, from *R. Bankisia*, rather tender. The chief kinds of autumn roses are the following: Macartney Roses, from *R. bracteata*, rather tender, Musk Roses, from *R. moschata*, with a musk like odour, Perpetual Moss Roses, crosses between the Moss and the Hybrid Perpetual groups, Noisette Roses, hybrids between the Musks and the Chinas, named from their introducer, including Marichal Niel (golden yellow), &c., Chinese Roses, from *R. indica*, mostly dwarf and tolerably hardy, Japanese or Ramanas Roses from *R. rugosa*, with leathery rugose leaves, Hybrid Perpetual Roses, the most popular and most extensive class, derived from the Damask, Bengal, Chinese, Bourbon, and other kinds, including A. K. Williams, General Jacqueminot, Mrs. John Laing, Prince Camille de Rohan, Duke of Edinburgh &c., Bourbon Roses, probably hybrids from the Bengal species and the Damasks or similar kinds, Tea scented Roses, hybrids from *R. indica*, delicate, elegant varieties, but rather tender, blooming for a long period, including Cléopâtre, Niphetos, Perle des Jardins, The Bride, Gloire de Dijon, &c., Hybrid Noisettes, and Hybrid Teas, hybridized from Teas and Hybrid Perpetuals, a new class, including Augustine Guionnesau, Captain Christy, Caroline Salisbury, Mrs. W. J. Grant.

The Rose prefers a rich, deep, loamy, well drained soil. The best time for planting is in late autumn, but some kinds (Teas, Noisettes, &c.) should be planted in spring. Pruning and pegging down require to be done with care and with reference to the special qualities of the different varieties. Some kinds of roses are excellently adapted for pot culture. The propagation of the rose is effected by means of seeds, cuttings, layers, suckers, buds, or grafts. The first of these methods is adopted when new varieties are desired, especially after a cross has been made. The stocks usually employed in budding, which is the commonest method of propagation, are the Dog Rose, the Boursault, the Manetti, the China, &c., the first named being the best. Attar of Roses is an ethereal oil obtained by distillation from the flowers of some species of rose (especially *R. centifolia*), particularly on the south slopes of the Balkans, where roses are cultivated for this purpose. Other preparations, used in perfumery and pharmacy, are also obtained from roses. See Dean Hole's Book about Roses (1st. ed.,

1869, now in 15th ed.), Hibberd's *The Amateur's Rose Book* (1st ed., 1864), Thompson's *Gardener's Assistant* (new ed., 1901), Joret's *La Rose dans L'Antiquité et au Moyen Age* (1892), &c

ROSE ACACIA (*Robinia hispida*, natural order Leguminosæ), a highly ornamental flowering shrub inhabiting the southern parts of the Alleghany Mountains, and now frequently seen in gardens in Europe. See LOCUST.

ROSE CHAFER (*Cetonia aurata*) a species of Coloptera or Beetles, included in the tribe of Lamelli cornia, which are known by their antennæ being terminated by a club, and composed of leaf like joints applied together like the leaves of a book. The larvae or caterpillars of the rose chafer inhabit decayed wood, the perfect beetles being found, as their name implies in the flowers of the rose.

ROSE FESTIVAL, a peculiar kind of festival which is celebrated annually on the 8th of June in some French villages.

ROSEMARY (*Rosmarinus officinalis*), a shrubby aromatic plant, growing wild in the southern parts of Europe. It belongs to the natural order Labiata, and has but two stamens. The stem is 3 or 4 feet high, bearing opposite, linear, and sessile leaves, which are smooth and shining above, and whitish and cottony on their inferior surface, the flowers are pale blue, and arise from the axils of the leaves. They expand in April and May. All parts of the plant have a strong and penetrating odour. The leaves are used in Italy for seasoning certain dishes. Rosemary is tonic and stimulant, and formerly enjoyed considerable repute as a medicine, but is now rarely employed. It yields, by distillation, a light, pale, essential oil, of great fragrance.

ROSENMÜLLER — 1 JOHANN GEORG, a celebrated German theologian (born in 1736, died in 1815), was professor of theology at Erlangen and Leipzig, and distinguished himself as a preacher, and by his activity in the cause of education. Of his numerous works we shall mention only his *Scholia in Novum Testamentum*, and his *Historia Interpretationis Laborum Sacrorum* (five vols 1795-1814). — 2 ERNST FRIEDRICH KARL, a distinguished orientalist, son of the preceding, born in 1768, was educated at Leipzig, where, in 1795, he became extraordinary professor of Arabic, and in 1813 ordinary professor of oriental literature. Among his works are his valuable *Scholia in Vetus Testamentum*, *Scholia in Novum Testamentum*, *Das alte und neue Morgenland* (six vols 1818-20), *Handbuch für die Literatur der biblischen Kritik und Exegese* (four vols Göttingen, 1797), *Handbuch der biblischen Alterthums kunde*, (four vols Leipzig, 1823-31). These works contain a great mass of valuable matter, critical, exegetical, geographical, and historical. Rosenmüller has also rendered important services to oriental literature by his *Institutiones Lingue Arabicæ* (1818), *Arabum Adagia*, *Analecta Arabica* (1826, two vols), &c. — 3 JOHANN CHRISTIAN, brother of the preceding (born 1771, died 1820), was an eminent anatomist, and in 1800 was appointed extraordinary and in 1804 ordinary professor of anatomy and surgery at Leipzig. Besides some writings on subjects of natural history, he was the author of *Chirurgisch-anatomische Abhandlungen* (three vols Weimar, 1804-12), *Handbuch der Anatomie* (Leipzig, 1808), and of various other works, besides articles in *Pierer's Medical Dictionary*, &c.

ROSE NOBLE, an English gold coin of the value of 6s 8d, first struck by Edward III, in 1334, and so called because it was of the same value as the noble, a money of account, and was stamped on one side with the figure of a rose. It ceased to be coined in the reign of Henry V.

ROSE OF JERICOHO (*Anastatica hierochuntina*), a cruciferous plant, growing in the arid wastes of Arabia and Palestine, and remarkable for its susceptibility to moisture. When full grown its branches become dry and rigid, causing it to contract and coil up in the form of a ball, in which state it is blown by the winds from place to place, till it is brought into contact with moisture, when it uncoils, expands its branches, and appears as if endowed with a new life. The generic name has been applied to it from this circumstance, and in Greek signifies resurrection. It is a small, annual, herbaceous plant, 3 or 4 inches high, with minute white flowers, which are succeeded by a little pod, divided into two cells, each containing one or two seeds. When the seeds are ripe, the leaves fall off, and the branches curl inwards and interlace.

ROSES, WARS OF THE, the fierce struggle for the crown of England between the Lancastrians (who chose the red rose as their emblem) and the Yorkists (who chose the white), it lasted thirty years (1455-85), and it is estimated that twelve princes of the blood, 200 nobles, and 100,000 gentry and common people perished. See ENGLAND—History.

ROSETTA (Egyptian, *Rashid* or *Reshid*), a city of Egypt, near the mouth of that branch of the Nile anciently called the *Bolbitine*, now commonly called the *Canal of Rosetta*, pop 13,500. Rosetta is thought to have been built by the caliphs in the ninth century. It long formed the medium of communication between Alexandria and Cairo, but it has lost much of its importance and prosperity since the construction of the Mahmoudieh Canal (1819), and still more since the railway was introduced into Egypt. The city is more neatly built than the other Egyptian cities. The streets are not, however, broad, and as the houses are of several stories, each projecting over that beneath, they nearly meet at the top, which promotes coolness, but gives a gloomy appearance to the place. Rosetta was captured by the French in 1798, by the English and Turks in 1801, and here the English were repulsed by the Turks in 1807.

ROSETTA-STONE, a piece of black basalt, about 3 feet 7 inches long and 2½ feet wide, containing a triple inscription, a decree in honour of Ptolemy Epiphanes, by the priests of Egypt assembled at Memphis, about 196 B.C., and recording their gratitude for his remission of arrears of taxes and dues owed by the sacerdotal body. The first version of this inscription is in hieroglyphics, the next in a native popular dialect (Coptic), and the third in Greek. This stone was discovered by the French at Rosetta in 1798, was brought to England in 1802, and is now preserved in the British Museum. See HIEROGLYPHICS.

ROSEWOOD, a hard and beautifully coloured cabinet wood of more than one kind, chiefly brought from Brazil, and is obtained from several undetermined species of tree, one of which is probably the *Dalbergia nigra*, natural order Leguminosæ. A tree of this genus yields Indian rosewood. It is known to be the *Dalbergia latifolia*.

ROSEWOOD, OIL OF, a pale yellow oil obtained by distilling rosewood (not the rosewood of commerce, but *Rhododaphne*—*Coniolum scoparium*) with water. It consists chiefly of a hydrocarbon, C₁₀H₁₆, which boils at about 250°, and smells like roses and sandalwood.

ROSICRUCIANS, members of a secret society, the existence of which became known unexpectedly at the beginning of the seventeenth century. Early in that century appeared several books concerning the society, which are now generally ascribed to Johann Valentin Andrea, a Lutheran clergyman, and among which is the *Fama Fraternitatis R. C.* (1614).

This work is the story of a certain holy and reverend Brother Christian Rosenkreuz, a German noble of the fourteenth century, who, inspired with the lofty ambition of reforming the world, spent a large portion of his days among the Brahmans, and in Jerusalem, Damascus, Egypt, Morocco, Fez, &c., in the pursuit of wisdom. Returning to Germany he founded an order, consisting of but few members, who met in a house erected by himself, and called Sancti Spiritus Domus, where he died at the age of 106. His burial-place was to be kept a secret by all the adepts, but he ordered the words 'Post CXX annos patebo' to be inscribed upon one of the doors of the house of the order. To this work was added another, Confession of the Society and Brotherhood of the Rosy Cross, addressed to the learned of Europe. This tract declared that the order had no intention of interfering with the religious or political action of states, but only desired the improvement of mankind by the discovery of the true philosophy. Whether such a society ever existed or no is still an open question. Many will have us believe that the above treatises were meant by Andrea to satirize in serio comic style the philosophical follies of the age, having no expectation of them being regarded otherwise than as fiction. Whatever may have been the secret of the Rosicrucians, it has been well kept. The popular impression that such societies did exist gave rise, however, to a number of associations that spread over Europe, and owing to the general ignorance of their principles and objects, they have become in one way or other connected in public opinion with the Freemasons, Cabalists, Illuminati, &c. In the celebrated work, the Comte de Gabalis, by a professed Rosicrucian, is found the division of spirits inferior to angels into sylphs and gnomes, which furnished Pope with the machinery of his Rape of the Lock. The fraternity had fallen out of public attention for a long time, when in the latter half of the eighteenth century the interest in their organization was revived, especially by Cagliostro, who gave out that he was a Rosicrucian. One of the most exhaustive works on Rosicrucianism is that of Buhle, entitled Ueber den Ursprung und die vornehmsten Schicksale der Ordens der Rosenkreuzer und Freimaurer (Göttingen, 1803), in which the author attempts to demonstrate that the Rosicrucians were the originals of the Freemasons, and that 'true masonry is neither more nor less than Rosicrucianism as modified by those who transplanted it into England'. See Waite's The Real History of the Rosicrucians (1887).

ROSIN, the name given to the resin of coniferous trees employed in a solid state for ordinary purposes. It is obtained from turpentine by distillation. In the process the oil of the turpentine comes over and the rosin remains behind. There are several varieties of rosin, varying in colour from the palest amber to nearly black, and from translucent to opaque. It differs somewhat according to the turpentine from which it is derived, this being obtained from numerous species of pine and fir. It is used in the manufacture of sealing wax, varnish, cement, soap, for soldering, in plasters, &c. Colophony is a name for the common varieties.

ROSKOLNICIANS, or RASKOLNICIANS (Russian *Raskolnik*, Separatists), the collective name given to the religious sects of Russia which have originated by secession from the state church on the occasion of the complete revision, by the Patriarch Nikon, of the ancient Slavonic ritual books, in the middle of the seventeenth century. Against this change of the official church rituals there arose a violent opposition, the leaders of which charged the state church with apostasy from the faith, and proclaimed the neces-

sity of quitting its communion. As there was no harmony among them a number of sects sprung up at the same time. They have all been persecuted by the government with the utmost cruelty, which policy, though now abandoned to a great extent, explains the existence of an element of communism, and of disaffection towards the reigning dynasty among a considerable number of the sectaries. They may be divided, in general, into two large classes, the *popish* (Russian *pop* priest), or those who have priests, and the *anti popish*, those who do not recognize any priestly order. The most important or best known among the numerous sects are 1 The Duchoborzi, who have neither churches nor ordained priests, reject oaths, condemn war, and resemble in many other ways the Quakers, the Cossacks of the Don belong mostly to this sect. 2 The Pomeranians, also an anti popish sect, celebrated for defending suicide, for which they quote Mark viii 35. 3 The Philippiques (see article under this heading). 4 The Jevlevshitsina, a popish sect, who are said to permit freedom of divorce and exchange of wives. 5 The Chernobolzi, who refuse to take oaths and to say the prayer for the emperor prescribed in the litany. As to the aggregate number of the Roskolnicians, it is impossible to obtain any trustworthy information, as every Russian census includes them in the membership of the national church. The statements of the Russian writers vary from 5,000,000 to 15,000,000 the latter estimate is generally believed to be nearest the truth.

ROSLIN, or ROSSIN, a small village in the county of Mid Lothian, parish of Lasswade, about 7 miles south of Edinburgh. The village is inhabited chiefly by families engaged in agricultural pursuits. It was formerly a place of some importance, made a burgh of barony by James II of Scotland, and privileged with the right of holding markets and fairs, but is now chiefly remarkable on account of its ruined castle and collegiate chapel. Roslin Castle is of uncertain origin, but it was the ancient seat of the St. Clairs or Sinclairs, who lived here in great splendour in the fifteenth century. It is situated on a detached rock in a deep glen on the north side of the river North Esk, but the station, though highly pleasant and romantic, seems by no means adapted for a fortress, as it is commanded by hills on both sides of the river. The access to it is by a bridge over a deep gully, and through a gate, originally of great strength. In 1554 it was burned by the forces of Henry VIII, and the present buildings were chiefly erected since that period. Roslin Chapel was founded in 1446 by William St. Clair, prince of Orkney and duke of Oldenborough (Oldenburg), and dedicated to St. Matthew the evangelist. This structure is incomplete, consisting only of the chancel and part of a transept. It is in the Gothic style, richly ornamented, and the character of the building makes it almost certain that St. Clair must have brought his architects from Spain. The interior, 69 feet in length and 34 in breadth, is divided into a nave and aisles by two ranges of clustered pillars adorned with sculptured foliage and figures of exquisite workmanship, one especially, the Prentice's Pillar, being very peculiar in its structure. Roslin gave name to a British earldom in 1801. Pop of the village, (1891), 730.

ROSS, a market town in England, in the county of Hereford, 11 miles south east of the town of that name, on an eminence near the Wye. The principal public building is a handsome parish church, in which the philanthropic John Kyrle, Pope's 'Man of Ross,' is interred. The iron trade, which formerly flourished here, has long since declined, and cider, malt, and wool are now the principal articles of trade. Pop (1881), 3724, (1891), 3576, (1901), 3302.

ROSS, SIR JAMES CLARK, an Arctic explorer, was born in London, 15th April, 1800. He entered the navy at the age of twelve, accompanied his uncle Sir John Ross (see following article) on his two voyages in search of a north west passage, and in the interval between them accompanied Captain William Parry in his three Arctic voyages. He was promoted to the rank of post captain in 1834 for his valuable services in connection with the second voyage of his uncle, particularly for the discovery of the north magnetic pole. His most memorable expedition was that to the Antarctic Ocean, undertaken in 1839, which occupied four years. He had the command of the *Erebus*, of 370 tons, and was accompanied by Commander Francis R. M. Crozier in the *Terror*, of 340 tons. The discovery of a vast continent bordered with a barrier of ice 150 feet high, and named by the discoverers Victoria Land, the observation of an active volcano, which they called Mount Erebus, and valuable additions to scientific knowledge in magnetism, meteorology, zoology, &c., were the fruits of this expedition. Three persevering attempts were made to reach the south pole, and the ships succeeded in reaching the latitude of $78^{\circ} 10'$. A narrative of this expedition was published in 1847 by Captain Ross, under the title of *A Voyage of Discovery and Research in the Southern and Antarctic Regions during the Years 1839-43*. The discoverer was knighted, and received from Oxford the degree of D.C.L. on his return. In 1848 he made a voyage in the *Enterprise* to Baffin's Bay in search of Sir John Franklin, but without success. He died at Aylesbury, 3d April, 1862. He was skilled in astronomy, magnetism, meteorology, zoology, botany, and other sciences, and was a fellow of the chief English learned societies, and a corresponding member of several foreign societies. In 1841 he was presented with the founder's gold medal by the London Geographical Society, and the following year received the gold medal of the Geographical Society of Paris.

ROSS, SIR JOHN, C.B., Arctic navigator, was a son of the minister of Inch, Wiltshire, and born on 24th June, 1777. In 1786 he entered the navy, in 1805 attained the rank of lieutenant, and in 1812 was made commander. Receiving the command of an expedition to the Arctic regions, with the view of ascertaining the existence of a north west passage, he sailed in April, 1818, and after exploring Baffin's Bay and parts adjacent, he returned to England. Shortly after, he was advanced to the rank of post captain, and the following year published an account of his voyage. In 1829 he again sailed for the Arctic regions in command of an expedition fitted out by Sir Felix Booth. On this occasion he was compelled to pass three successive winters among the polar ice, but succeeded in reaching England in 1833. In 1834 Captain Ross was knighted and at the same time created C.B., and in the following year published a *Narrative of a Second Voyage in Search of a North west Passage, and of a Residence in the Arctic Regions during the Years 1829-33*. The office of consul at Stockholm was bestowed on him in 1839, and retained till 1845. The endeavours to ascertain the fate of Sir John Franklin and his companions occasioned the last voyage undertaken by Sir John Ross. In command of the *Felix*, a small vessel of 90 tons, he proceeded in 1850 to the polar regions, and remained there for a winter, but returned without effecting any object of importance. He became a rear admiral in 1851, and died in London on 30th August, 1856.

ROSS AND CROMARTY, a northern county of Scotland, formerly two separate counties, Cromarty consisting of pieces of territory scattered through the county of Ross. The united county forms an extensive district, extending from the North Sea to the

Atlantic, bounded on the south by Inverness and the Beaulieu and Moray Firths, on the north by the Firth of Dornoch and Sutherlandshire. The county also includes Lewis (which see). The area is 2,049,423 acres, of which nearly a million are mountain and heath land, used for grazing. The area under corn crops is about 45,000 acres, that under green crops about 25,000, and there are under 30,000 in permanent pasture and over 60,000 under woods and plantations. The west coast is bold and rugged, and deeply indented with bays and inlets, the principal being Lochs Alish, Carron, Torridon, Ewe, Broom, Little Loch Broom, and Gairloch. The principal inlets on the east coast are Beaulieu Firth, and Cromarty and Dornoch Firths. The fertile peninsula lying between Beaulieu Firth and Moray Firth on the one side and Cromarty Firth on the other is called the Black Isle. A great portion of the county consists of lofty rugged mountains with deep intervening glens and ravines. Many of the summits reach an elevation of more than 3000 feet, as Ben Wyvis, with Ben Attow, Carn Eige (3877 feet) and Mam Soul (3862), on the Inverness border. The western part of the county is chiefly pastoral, the agricultural portions being those which extend along the Firths of Moray, Cromarty, and Dornoch, and enjoy a fine soil and climate. As in most of the other counties in Scotland, agriculture has been much improved here of late years, the crops of wheat and turnips being at present equal to those in the more southern counties. Potatoes, oats, and barley are the chief crops of the smaller tenantry. A marked improvement has taken place in the breeds of cattle and sheep, both of which are extensively reared. There are no rivers of any considerable size, but there are several fine lakes, the principal of which is Loch Maree, about 12 miles long by 2 miles broad. The county returns a member to Parliament. Principal towns: Dingwall (the county town), Stornoway, Cromarty, Invergordon, Tain, and Fortrose. Pop (1891), 77,727, (1901), 76,421.

ROSSANO, a town of Southern Italy, in the province of Cosenza, on a rocky height 3 miles south of the Gulf of Taranto. It is walled, defended by a castle, well built, and contains a cathedral faced with marble. It was founded at a very early period by the Greeks, became a Roman colony, and was pillaged by the Goths under Totila. Pop 14,267.

ROSSBACH, a village in the Prussian province of Saxony, between Naumburg and Merseburg, famous for the decisive victory which Frederick the Great obtained there over the imperial and French troops under Marshal Soubise, November 5, 1757. The French were taken by surprise and suffered a complete defeat, leaving some 3000 men on the field, while 7000 were made prisoners, among them 300 officers. All their baggage and artillery fell into the hands of the Prussians, who only lost some 500 men. See SEVEN YEARS' WAR.

ROSSE, WILLIAM PARSONS, THIRD EARL OF, the celebrated practical astronomer, was born at York, 17th June, 1800. He was educated at Dublin University and at Magdalen College, Oxford, where he graduated first class in mathematics in 1822. He was member of Parliament for King's County from 1821 to 1834, and succeeded his father in the earldom in 1841. In 1845 he was elected a representative peer of Ireland, but he took little interest in politics. During the stormy discussions on the first reform bill he was occupied with the construction of his first famous reflecting telescope, the speculum of which had a diameter of 3 feet, and which was soon superseded by one of double the size. The difficulties in the way of producing such large reflecting mirrors are of the most formidable description. The two

great defects which had hitherto baffled opticians were spherical aberration and absorption of light by specula, and in the coating of those of large size there arose the apparent impossibility of preventing cracking and warping of the surface on cooling. Every step in the process had to be pioneered by experiment, and success was only attained at the cost of many and harassing failures. Even the proper admixture of the metals for the reflector had to be ascertained by numerous and costly experiments. At last, however, a gigantic speculum, weighing 3 tons, was turned out without warp or flaw. It was then polished and mounted on a telescope of 52 feet in length in Lord Rosse's park at Parsonstown, at a cost of £30,000. A series of cranks, swivels, and pulleys enables this huge instrument to be elevated or depressed at pleasure, to be moved round to the different quarters of the heavens, and to be handled with as much ease as telescopes of ordinary size. The sphere of celestial observation was immensely widened by an instrument so powerful, nebulae which had defied Herschel's telescope were resolved into stars, and new nebulous mist was revealed to the observation. The construction of the telescope, which was wholly effected under the earl's personal direction and superintendence, is fully described in the *Philosophical Transactions of the Royal Society*, of which body he was president from 1849 to 1854. He died on the 31st October, 1867.

ROSSETTI, DANTE GABRIEL, poet painter, one of a family distinguished in literature, was born in London, 12th May, 1828. His father (see next article), a native of Vasto in the Abruzzi, was a patriotic poet of considerable distinction, who for the prominent part he took in the revolutionary movements in Naples in 1821 had to flee his native country and take refuge in England. Young Rossetti, showing a strong determination towards art at the age of fourteen, began to study, first at Cary's Art Academy, a celebrated school of the day, and afterwards at the Antique School of the Royal Academy. In 1849 he exhibited his first picture, the *Girlhood of Mary Virgin*. About this time Rossetti, much impressed with the originality of certain cartoons exhibited by Mr. Madox Brown, and the poetic imagination that inspired them, joined himself with Millais, Holman Hunt, Thomas Woolner, and some others in the formation of the celebrated Pre-Raphaelite Brotherhood. This coterie, which from the first had Madox Brown as a friendly adviser and coadjutor, and soon enlisted the powerful pen of Ruskin in its defence, has had, in both its earlier and later developments, an important effect on modern art. The Germ, a periodical devoted to the principles of the new school, had a short but brilliant career, and is now highly prized. Rossetti early displayed talent for poetry as well as painting, and many of his more admired poems date from an early period in life. In 1861 he published his well-known translations of the *Earlier Italian Poets* from Ciullo D'Alcamo to Dante Alighieri, in the original metres, these with his volume of *Poems* published in 1870, and his *Ballads and Sonnets*, 1881, constitute his contributions to literature, and are characterized by all the vivid imagination, spirituality, and sensuous colouring which distinguish his paintings. He painted in water colour as well as in oil. Rossetti's pictures were seldom publicly exhibited, hence his reputation as a painter has had to depend mainly upon the enthusiasm of a few fit judges who have had access to the private collections containing his works. His principal paintings are *Dante's Dream*, the *Salutation of Beatrice*, the *Dying Beatrice*, *La Pia*, *Proserpina*, the *Blessed Damozel*, *Pandora*, the *Sibylla Palmifera*, *Monna Vanna*, *Venus Verticordia*, and numerous others, the scenes of which are

taken from mediæval legends, especially those of the Arthurian cycle, and ancient ballad poetry. Some of his most important designs were left unfinished, such as *Mary Magdalene at the Door of Simon the Pharisee*, the *Death of Lady Macbeth*, and *Desdemona's Death Song*. His wife died in 1862, two years after marriage, and this stroke he never thoroughly recovered from. He was thrown into such a state of hopeless despair that he buried his poetical manuscripts in his wife's coffin, though he had them unburied seven years later. In his latter years he suffered much from insomnia, to alleviate which he had recourse to chloral, which had the effect of aggravating his complaint. He was also strongly affected by the critical censure that some of his poems had excited, and which were condemned chiefly on the score of alleged immorality. He lived secluded from all except a very few familiar friends, and died at Birchington-on-Sea, near Margate, 9th April 1882, in his fifty-fourth year. See the *Letters and Memoirs* (1895) by W. M. Rossetti, Esq. (1887) by Knight, and F. G. Stephens in the *Portfolio* (1894).

ROSSETTI, GABRIELE, an Italian poet and critic, was born at Vasto, in Abruzzo Citeriore, in 1783. In 1814 he was appointed keeper of the museum of Naples, but the free expression of his political views being obnoxious to the government, he was compelled to leave Italy in 1821. Three years later he came to England, and in 1831 became professor of Italian in King's College, London, a post which he felt compelled to resign in 1845 on account of blindness. He died in London on the 26th of April, 1854. His poetical works, which are pervaded by pure religious thought, a strong love of country and of liberty, comprise—*Iddio e l'uomo* (London, 1833), *Il Veggente in Solitudine* (1843), *Poesie* (1847), *L'Arpa Evangelica* (1852). His works on Italian literature, in which he attempts to prove that all the mediæval poets used a jargon under which they veiled their hatred of the Papacy, and symbolized the true religion under the form of a woman beloved by them, include *Comento Analitico alla Divina Commedia* (1826-27), *Sullo Spirito Antipapale che produsse la Riforma* (1830), *Il Mistero dell'Amor Platonico Svelato* (1840). He married a lady who was half English half Italian by birth, and they had a family of four. His son Dante Gabriel distinguished himself both in painting and poetry (see above article). His daughter Christina Georgina (born 1830, died 1894) also gained a wide reputation for her poems, many of which were contributed to the various popular magazines of our day. They include *Goblin Market* and *Other Poems* (1862), *The Prince's Progress and Other Poems* (1866), *A Pageant and Other Poems* (1881), &c. Another son, William Michael (born 1829), has distinguished himself as a critic, editor, and man of letters generally. A daughter, Maria (born 1827, died 1876), was favourably known as a student of Dante.

ROSSINI, GIOACHINO ANTONIO, the greatest Italian operatic composer of his age, was born at Pesaro, 29th February, 1792. His father was a horn player in an orchestra of strolling players, and his mother was a second-rate actress and singer. At the early age of ten Rossini began his career by playing second horn to his father. Being possessed of a fine voice, he was put under a professor of singing, and sang the treble parts as a choir boy in the churches of Bologna, where he soon gained the reputation of being a splendid vocalist and skilful accompanist. On his voice breaking his occupation of chorister was gone, but the Countess Perticari, discovering his talent, sent him at the age of fifteen to the Lyceum of Bologna, where he received lessons in counterpoint from Padre Mattel. He never took

kindly, however, to the exercises in double counter point, canon, and fugue given him by the learned padre, but devoted his days and nights to the study of the great masters of Italy and Germany, more especially Haydn and Mozart. More than half a dozen operas or operettas were written by him before he scored a success, but when his *Tancredi* was put on the stage at Venice, in 1813, the success was unmistakable. Delighted crowds thronged the theatre, and for a time nothing was heard in the streets, drawing rooms, public promenades, or places of amusement but snatches of the beautiful airs of *Tancredi*. Within a year or two of its first production there was scarcely an opera house in Europe of any importance where it was not heard and received with enthusiasm, and the fortunate young composer was raised at once to the summit of fame. Opera followed opera from his pen in rapid succession. The same year saw the first performance of *L'Italiana in Algeri*, also brought out in Venice, in 1814 *Aurichiano in Palmira* and *Il Turco in Italia* were composed for the theatre of Milan, in 1815 he composed the *Elisabetta Regina d'Inghilterra* (*Elizabeth, Queen of England*) for the San Carlo Theatre at Naples, the title role being taken by Madlle Colbrand, one of the greatest and at the same time the most artistic operatic artists of the period, and whom Rossini subsequently married. In 1816 his *Torvaldo e Doriska* and *Il Barbiere di Siviglia* (*Barber of Seville*) were put upon the Roman stage. The latter opera is the first of his works that have kept a permanent hold on the stage. In the same year appeared at Naples the opera *buffa Gazzetta* and the opera seria *Otello*. In 1817 *La Cenerentola* (*Cinderella*) was brought out at Rome with no great success, but the enthusiastic reception of *La Gazzetta* (*The Thirteenth Magazine*) by the Milanese in the same year consoling the indefatigable composer. Before the year closed Rossini was ready with another opera *Armida*, for the San Carlo Theatre, and in 1818 the *Mose in Egitto* (*Moses in Egypt*) was first performed on the same stage. Then followed *Adelaide di Borgogna* (Rome, 1818), *Riccardo e Zoraida* (Naples, 1818), *Emione* (1819), *Eduardo e Cristina* (Venice, 1819), *La Donna del Lago* (*Lady of the Lake*) (Naples, 1819), *Bianca e Faliero* (Milan, 1819), *Maometto Secondo*, also known as the *Assedio di Corinto* (*Siege of Corinth*) (Naples, 1820), *Matilde di Sibarani* (Rome, 1822), *Zelmira* (Naples, 1822) and *Semiramide* (Venice, 1823), one of his finest inspirations, and which is still a favourite, though its first performances did not augur well. In 1823 Rossini left Italy, and after a brief stay in Paris came to London in 1824 in consequence of an engagement at the Italian Opera, whereby he was to be musical director, and to produce a new opera composed for the theatre. This engagement was disastrous to the theatre, his wife, who was engaged as a prima donna, was coldly received, and did not reappear, and no new opera was produced. His visit was, however, profitable to himself through concerts, singing lessons, &c., so that after a five months' sojourn his gains amounted to £10,000. In 1825 he was appointed manager of the Italian Opera at Paris for eighteen months, and was then appointed to the sinecure posts of composer to the king and inspector general of singing in France. Up till 1829, with the exception of two little operas, *Il Viaggio a Reims* (*The Journey to Rheims*) and *Il Conte Ory*, Rossini wrote nothing, but in that year appeared what is considered his master piece, *William Tell*. It has all the grace of melody peculiar to the Italian school, combined in a great measure with the richness of harmony and variety of orchestration characteristic of the German. Its

ill constructed and wearisome libretto is much against it, and though its airs and concerted pieces are favourites in the drawing room or at concerts, it is seldom put on the stage. The cold reception it met with so affected the composer that he resolved to write no more, declaring, it is said, that one more success would add nothing to his fame, and a failure would injure it, that he had no need of the one, and did not wish to expose himself to the other. After a stay in Bologna the fall of Charles X. in 1830 having deprived him of the lucrative sinecures which he held under government he returned to Paris, and occupied himself in claiming compensation for the loss of his situations. He did eventually obtain some redress, and, quitting Paris in 1836, he went to live in a splendid mansion which he had built at Bologna. A *Stabat Mater* was written by him in 1832. He revisited Paris in 1843, and in 1855 took up his abode there, living a quiet indolent life, not enjoying always the best health, delighting his friends with his smart sayings and racy anecdotes, but composing nothing of any special moment except a *Messe Solennelle*, composed in 1864, but which was performed for the first time at his burial. He died on the 13th November, 1868, and was buried in *Père la Chaise*. He left by will an endowment of 3000 francs a year to be administered by the Institute of France one half for an annual prize for the best opera libretto, and one half for the best score, melody (of which Rossini himself was a master) to be regarded as the essential characteristic. See the *Life* by H. S. Edwards (1869) and the article in *Grove's Dictionary*.

ROSTOCK, a town of Germany, in the Grand duchy of Mecklenburg-Schwern, in a flat district, on the left bank of the Warnow which is here navigable and forms an inland lake communicating with the Baltic 59 miles N.E. of Lübeck. It is surrounded with fine promenades, and consists of the Old, the Middle, and the New Town. Of these the Old Town is the most irregular, and the Middle Town the most handsome. The edifices most deserving of notice are the palace of the grand duke, the town house, a building of singular appearance with seven towers, the church of St. Mary, a light and lofty structure of the fourteenth century, with a curious brass font, the university (founded in 1419, and usually attended by about 500 students), the house in which Blücher was born, and the house in which Grotius died. A statue of Blücher by Schadow stands in a square named after him. There are manufactures of machinery, cotton, tobacco, soap, paper, chemicals, &c., and distilling, brewing, and ship building are carried on. The trade is of great extent. The principal exports are corn, wool, flax, butter, and salt provisions, the greater part of the trade is carried on with England. The fisheries are also important. The town was for centuries a member of the Hanseatic League and still enjoys in a great measure its ancient privileges. Pop. (1895), 49,912, (1900), 54,735.

ROSTOF. See **ROSTOV**.

ROSTOPSHIN, FÉODOR VASSILIEVICH, COUNT, was born in 1763 of an ancient Russian family. He entered the imperial guards as a lieutenant, and afterwards travelled into foreign countries. He was subsequently highly promoted under Paul I., and loaded with orders, but afterwards dismissed in disgrace. Under Alexander he obtained the important post of governor of Moscow, and exercised an important influence over the campaign of 1812, even if the assertion of the French that the burning of the city was his work should be untrue. He himself decidedly denied this charge in his *Vérité sur l'Incendie de Moscou* (Paris, 1824). It is certain, however, that

he caused his villa near Moscow to be burned, and took measures for the destruction of the magazines in that city. In 1814 he accompanied the Emperor Alexander to the Congress at Vienna. He afterwards travelled, and spent several years in literary pursuits in Paris, where he became acquainted with some of the most distinguished families, and united his daughter in marriage to a grandson of the celebrated Count Ségur (French ambassador to the court of Catharine II). He returned to Russia, and died in Moscow 12th February, 1826. His works include a number of historical memoirs, comedies, &c., written in French and Russian, and published at St Petersburg in 1853. His daughter in law, EUDOXIA PETROVNA ROSTOPSHIN (born 1811, died 1858), has won an honourable name in Russian literary annals as a poetess and novelist.

ROSTOV, or **ROSTOF**, a town in Russia, in the government of Jaroslav, and 40 miles s s w of the town of Jaroslav, on Lake Nero. It is one of the oldest towns in Russia, being mentioned as early as 862, and being the seat of a principality in the 14th century. It has a great many churches, the chief being a cathedral consecrated in 1231, and possessing venerated relics. Its people are employed largely in the lake fisheries and in market gardening, and it has an important annual fair. Pop (1894), 17,416.

ROSTOV, or **ROSTOF**, a town in Southern Russia, in the government of Ekaterinoslav, picturesquely situated on an elevated site above the Don, about 20 miles above its mouth in the Sea of Azof. It is a prosperous place, a centre of trade and industry, connected by railway with the Caucasus, Moscow, and with Taganrog, and sending great quantities of grain and other produce by barges to the Taganrog roads to be there put on board ship. There are large annual fairs. Pop (1897), 119,889.

ROSTRA (incorrectly *rostrum*), a platform or stage (*suggestus*) in the forum in Rome, whence the orators used to harangue the people, so called from the beaks (*rostra*) of the ships taken, in 338 B.C., from the Antates, with which it was adorned. It was a circular structure raised on arches, with a stand on the top, bordered by a parapet, the access to it being by two flights of steps, the rostra were affixed to the front of it just under the arches.

ROT, the name applied to a disease peculiar to sheep, and caused by the presence in the gall bladder and biliary ducts of that animal of the common liver-fluke (*Distoma hepaticum*) of the sheep, a typical example of Trematode worms, represented by the various kinds of flukes. (See also TREMATODA and PARASITES.) These *Distomæ* undergo a peculiar metamorphosis or cycle of development, being found in their embryo state within the body of the fresh water snail. The average length of the mature fluke is about 1 inch. Within the liver of a single sheep several dozens of these parasites may sometimes be found, and the eggs and embryos being dispersed into water find their way into the bodies of snails. There the Cercarie or embryo flukes are produced, and Cobbold says that 'it is not certain whether the Cercarie are taken into the bodies of quadrupeds when the latter are drinking water or eating solid food, but it is probable that they are transferred in either way. It is not unlikely that they are often swallowed while still within the bodies of their molluscan or insect hosts. From the digestive organs of the sheep or cattle the Cercarie bore their way through the tissues into the liver.'

The effects of the presence of these parasites within the bodies of the sheep are to produce dropsical and other lesions. The whole system becomes disorganized, and the animal finally dies from a combination of causes, among which inanition is a prominent fea-

ture. The number of sheep destroyed in this way varies in different years. Wet seasons are said to be those most destructive, presumably on account of the *Distomæ* being, through their distribution in the damp pastures, afforded easier and fuller access to their hosts. In a bad year between 1,000,000 and 2,000,000 of sheep have been known to be destroyed by rot, but the usual number is of course much less than this. The treatment advocated appears to be that of purgation and analogous means, although no great benefit is derived from measures of any kind in severe cases.

ROT, DRY. See **DRY ROT**.

ROTA, a seaport in Spain, in Andalusia, on a point of land at the north west extremity of the bay, and 8 miles from the town of Cadix. It has a church with a fine Gothic nave, a pier with good anchorage for small craft, and a little trade in wine and other produce of the district. It was sacked by the British in 1702. Pop (1857), 7858.

ROTA (or **RUOTA**) **ROMANA**, the highest Papal court of appeal, whose jurisdiction formerly extended over all Catholic Christendom, and which decided not only spiritual controversies, but all questions concerning ecclesiastical benefits of a value above 500 *scudi*, and the decisions of which had the highest authority, derived from the doctrine of the pope's infallibility. The *Rota Romana* had a collegiate constitution, and consisted originally of twelve prelates, of whom eight were Italians, two French, one a German, and one a Spaniard. They collectively bore the title of *auditors della rota*, or auditors of the holy apostolic palace, because their sessions were held semi-weekly in the palace of the pope. The name of this and other courts was derived perhaps from the circumstance that the floor of the halls was inlaid with marble slabs in the form of wheels (*rotæ*), or, according to others, because the seats were disposed in the form of a circle or of a semicircle. Other supreme courts, as, for example, at Genoa, have borne the same name. The jurisdiction of this court was restricted latterly to the Papal States, and it was composed exclusively of Italians. See **CURIA (PAPAL)**.

ROTATION OF CROPS. Some plants require certain inorganic or earthy constituents of their food in larger quantity than others, and it is upon this fact that the rotation of crops is founded. Oats contain 4 per cent of ashes, hay 9 per cent, a ton of hay removes 200 lbs of ashes, and these ashes consist of the substances required by another ton of hay. The effect of constantly cultivating the same crop in the same field is to deprive the soil, to the depth to which the roots descend, of certain earthy materials necessary for the food of that particular plant, other inorganic substances, which the same plant does not take up, are left in the ground, and these in their turn become available to another crop suitably selected for alternation. Hence farmers are taught by chemical science and their own experience to grow a certain succession of crops in the same field. Wheat, barley, and oats are described as silica plants, that substance being an abundant constituent of their stems, pease, beans, and clover are distinguished as lime plants, turnips and potatoes as potash plants, and from the difference in their predominant inorganic food these crops are made to alternate with each other. In some virgin soils the same plants may be cultivated for many years in succession. This occurred in Virginia, where for a century the same crops were grown without manure, but exhaustion ultimately took place, and the crops became deficient. It is of importance for the agriculturist to discover the dormant inorganic elements in the soil, and adopt means for rendering them available. By allowing the ground to lie fallow, and ploughing and pulver-

ving it so as to obtain ready access for air and moisture, the substratum is decomposed and its materials are set free to be taken up by the roots of the plants.

ROTATORIA See ROTIFERA

ROTHE, RICHARD, an eminent German theologian, born 28th Jan, 1799, at Posen. He was educated first at the gymnasiums of Stettin and Breslau, and afterwards (1817) studied theology under Daub at Heidelberg. In 1823 he was appointed chaplain to the Prussian embassy at Rome, a position which he held till 1828. He afterwards became a professor at the theological seminary of Wittenberg. In 1837 he was elected professor and director of the new theological seminary of Heidelberg, a position he changed for that of university chaplain at Bonn in 1849, but returned once more to Heidelberg in 1854. He died there 20th August, 1867. The work upon which his fame chiefly rests is his *Theologische Ethik*, a complete system of speculative theology, published in three vols. at Wittenberg (1845-48, 2nd ed., completed by Holtmann, 5 vols., 1867-71). In this work he takes a middle position between the rationalistic and orthodox schools of theology and while not sparing the errors of the former, pleads with the latter for the reforms necessary to bring the teaching of the church more in harmony with the enlightened spirit of the age. Other important works of his are *Die Anfänge der Christlichen Kirche und ihrer Verfassung*, 1837, and *Zur Dogmatik* (1863). Among works posthumously published are *Dogmatik*, *Vorlesungen über Kirchengeschichte*, *Theologische Encyclopädie*, *Geschichte der Predigt*, *Predigten*, *Stille Stunden*, and *Übersicht der theologischen Ethik*.

ROTHENBURG OB DER TAUBER a town of Bavaria, in Middle Franconia, on a height above the Tauber, 29 miles S.W. of Würzburg. It is an ancient and interesting place with quite a mediæval aspect, having lofty walls flanked with towers, and though very irregularly built, contains many handsome buildings, private and public. Of the latter are a pure Gothic church, with beautifully painted glass and interesting monuments, a town house, orphan asylum, and hospital. Pop. (1895), 7193.

ROTHERHAM, a market town and county borough of England, in the West Riding of York, 5 miles north east of Sheffield, at the junction of the Rother with the Don. The Don is here crossed by several bridges. The church of All Saints, restored in 1874-75, is a splendid edifice in the Perpendicular style, built during the reign of Edward IV. The grammar school was originally founded in 1483. The other chief buildings comprise the council hall, corporation offices, school of science and art, the court house, the post office, a good hospital, the baths and free library, the mechanics' institute, the new market hall, &c. The manufactures include iron, steel, and brass goods, railway wagons, glass, chemicals, earthenware, pipe clay, beer, &c. There are two fine public parks. Rotherham gives name to a parliamentary division of the West Riding. Pop. (1891), 42,061, (1901), 51,348.

ROTHESAY, a royal burgh, seaport, and favourite watering place of Scotland, chief town of the county of Bute, is beautifully situated at the head of a fine bay on the north east side of the island of Bute. The town occupies the centre of the bight of the bay, and with its suburbs stretches along its east and west shores for above 2 miles on either side, in a series of handsome villas, a large area of ground in front of the town and reclaimed from the sea being tastefully laid out, and forming a beautiful promenade. The town hall and county buildings form a handsome structure, surmounted by a massive tower. There are places of worship in connection with the principal religious denominations, an academy, and

various other schools and seminaries, a hydropathic establishment, a public library, public halls, Norman Stewart institute, museum, public aquarium, &c. The town has a cotton spinning and weaving factory, and a considerable coasting and fishing trade. On account of the singular mildness and salubrity of its climate, Rothsay is noted as a winter residence for invalids (especially those affected with pulmonary diseases). Nearly in the centre of the town stands the ancient royal castle, a fine ivy covered ruin. It is first mentioned in history in the thirteenth century, it was burned by a brother of the Duke of Argyll in 1685, since which date it has been allowed to remain in ruins. Recently great improvements in and around the ancient castle have been carried out by the Marquis of Bute. Rothsay gives the title of duke to the Prince of Wales. Pop. in 1891, 9108, (1901), 9323.

ROTHSCHILD. This celebrated European house has raised itself from a humble sphere to an unexampled degree of wealth and importance by judicious enterprise, a sagacious and systematic series of operations, a reputation for fair dealing, and a correct estimate of men and events. The founder of the house, Mayer Anselm, was born of Jewish parents at Frankfurt on the Main in 1743, and died in 1812. His parents died when he was but eleven years old, and he was, as is common with poor Jews in Germany, educated for a teacher. This occupation not suiting his taste Rothschild engaged in trading in a small way, and was not long after employed in a banking house in Hanover, and in a few years his industry and frugality made him master of a small capital. Returning to Frankfurt he married, and established the banking house which is still in existence. The house originally consisted of his five sons—Anselm, born in 1773, Solomon, born in 1774, Nathan, born in 1777, Charles, born in 1788, and James, born in 1792. Anselm resided at Frankfurt, Solomon was located in Vienna, Nathan resided in London till his death there in 1837, Charles (Baron) in Naples, and James (Baron) at Paris. In 1813 occurred those political events which raised the house of Rothschild to the position it has since occupied in the commercial and financial concerns of the world. In twelve years about £100,000,000 sterling were raised by them by way of loan or subsidy, which were distributed in nearly the following proportions: for England, £40,000,000, for Austria, £10,000,000, for Prussia, £8,000,000, for France, £16,000,000, for Naples, £10,000,000, for Russia, £5,000,000, for several German courts, about £1,000,000, for Brazil, over £2,000,000, exclusive of various other large sums. The remarkable success of the Rothschilds, setting aside the great opportunities which they have enjoyed from favourable circumstances, may be attributed to their strict adherence to two fundamental maxims. The first of these, in compliance with the dying injunctions of the founder of the house, is their conducting all their operations in common. Every proposition of magnitude made to one of them is submitted to the deliberations of all, no project is adopted until thus fully discussed, and it is then executed by united efforts. A second principle is, not to aim at exorbitant profits, to set definite limits to every operation, and, so far as human prudence and oversight can do, to render it independent of accidental influences. In this maxim lies one of the main secrets of their strength. The reasonableness of their terms, the punctuality with which they execute their contracts, the simplicity and clearness of their plans, and their judicious manner of carrying them into effect, fortify their credit. Before the introduction of the telegraph their couriers were frequently in advance of those of the government. Several princes

have publicly acknowledged their obligations by conferring nobility and other honours upon the different members of the family. It is understood that the Rothschilds, individually and conjointly, sustained a loss of several millions by the French and other revolutions of 1848. The brothers Anselm, Solomon, and Charles all died in 1855, and James in 1868. Lionel (Baron), son of Nathan and head of the London house, was the first Jewish member of the British House of Commons, taking his seat in July, 1858, as one of the representatives of London. His son, Nathaniel Meyer, was created a baron of the United Kingdom in 1885. As the members of each succeeding generation are gradually admitted into the firm, and as the cousins generally intermarry, the family seems destined for long to occupy the position of monarchs of European finance.

ROTIFERA, ROTATORIA, or WHEEL ANIMALCULES, a group of organisms, microscopic as to size, found in habitating water, and distinguished by the possession of an anterior disc-like structure (*trochal disc*), furnished with vibratile cilia or filaments, and which is capable of being everted and inverted at will. The general possession of this ciliated disc is the distinctive feature of the Rotifera, the zoological position of which was for long a matter of discussion among naturalists. Their popular name of 'Wheel Animalcules' has been derived from the appearance of a revolving wheel produced by the movements of the cilia which fringe the front disc—an appearance which, as will be presently explained, is quite illusory. For long these animalcules were confused in their identity with the Infusoria (see PROTOZOA), the latter being forms of much lower organization, and not at all to be compared in complexity of structure with the Rotifers. The first Rotifer was discovered by Leeuwenhoek in 1702, who then described the *Rotifer vulgaris*. This naturalist, attracted by the red colour of the rain water which had collected in a gutter of his house, examined a drop of it by aid of the microscope, with the result of discovering therein an immense number of animalcules. Some of these he tells us were red in colour, others being green, and he also noted that their bodies were 'composed of particles of an oval shape,' and that they possessed 'certain short and slender organs or limbs, which were protruded a little way out of their bodies, by means of which they caused a kind of circular motion and current in the water.' Leeuwenhoek also subsequently described other Rotifera, such as the well-known *Meliceria ringens*, and in 1824 Bory St. Vincent had a catalogue of at least eighty species. At this latter period, however, the special identity and relations of the Rotifera had not been made out. They were simply 'animalcules' to these older observers, and as such were indistinguishable from the swarms of Infusoria and other minute forms of animal life already known to them. Ehrenberg was among the first to separate out the Wheel Animalcules from amongst the other forms, and to assign to them through his microscopic investigations of their structure a higher place in the animal scale than the Infusoria and their allies, and the labours of more modern days and of recent inquirers, armed with powerful microscopes, have resulted in our recognition of this group of organisms as a defined class so far as its own internal organization is concerned.

It is, however, still a matter of choice and of discussion as to the position which the class Rotifera should hold in the animal kingdom, in other words, the determination of the relationships of the class as a whole has been found to be a matter attended with much difficulty. The position which has been most commonly assigned to these animalcules has been that

of an aberrant subdivision of the Schelida—the class of Echnozoa or Annuloida, represented by the Tape-worms, Flukes, and other forms, parasitic and non-parasitic. Other observers have placed the Rotifera as a subdivision of the Annelida or True Worms, thus bringing them within the limits of the Annulose subkingdom. The late Professor Huxley at one time seemed inclined to adopt this view. Thus, in one place he observes: 'The free Rotifera present marked resemblances to the telotrochous larvæ of Annelides', telotrochous larvæ being those in which a band of cilia encloses the body in front of the mouth, whilst a second band exists around the anal region, with a tuft of cilia attached to the centre of the *præstomum* or segment in front of the mouth. The position of the 'Wheel Animalcules', as distinguished by their embryology and development—the safest guide towards ascertaining the true position and genealogy of any group of organisms—would therefore seem to be that of a section intermediate between the Turbellaria and Annelida. Certain Rotifera it is to be noted, depart widely in structure and characteristics from this position, and appear in this way to increase the wide spread affinities of the group. And in any sense these animalcules have no affinity with the crustaceans, as has been asserted by some naturalists.

These animals are mostly inhabitants of fresh waters. They are found both in a free swimming and in a temporarily or usually attached state, and some may be parasitic. Thus, *Albertia* is found within the bodies of some Oligochaetous Annelids, of which group the Earth worms are familiar examples, and *Balatro* similarly exists on the outer surfaces of these Annelidan forms.

The body in Rotifera is generally elongated, and usually exhibits transverse constrictions or divisions, which, however, are limited to the outer or integumentary layer merely. Their minute size has already been referred to, none of these forms being larger than the $\frac{3}{16}$ th of an inch in length. The body is generally covered by a chitinous or horny skin, which is not ciliated over its surface, and the parietes or walls of the body are provided with both longitudinal and circular muscular fibres, which may be smooth or striated. (See MUSCLE.) The generally characteristic trochal or wheel disc exists at the anterior part of the body, the mouth opening in the middle or at one side of this disc. The disc varies in its development throughout the group. It is largest in the free swimming forms, which move about rapidly by means of the cilia with which it is provided. It may be circular, kidney shaped, bilobular, quadrilobular, or multilobular in shape. It is bilobular or horse shoe shaped in *Meliceria* and *Lacuncularia*. In *Albertia* and *Notommata tardipada* it is of small size, and is represented by a mere lip-like process bordering the mouth. In *Lindia*, *Laphrocampa*, *Balatro*, *Chaetonotus*, &c., the trochal disc is wanting. In parasitic forms (*Balatro*, &c.) we can understand this degeneration as adapting them for their attached mode of life.

By means of the cilia with which the trochal disc is furnished locomotion in these animalcules is subserved, and at the same time their nutrition provided for, particles of food being thus swept towards the oral aperture or mouth. The ciliary movements, as has already been remarked, give rise to the illusion of a revolving wheel, this impression being produced much in the same way as are the apparent waves which sweep over the surface of a corn field, the spectacle being produced simply by the bending in turn of the individual and fixed stalks of grain. In the same way the observer on the sea shore might fancy that successive waves swept inwards to the

land, each wave in reality retiring and again flowing inwards. The disc itself is capable of retraction and protrusion.

With regard to the appendages of the body in these forms the most important perhaps is the terminal organ known variously as the *tail* or *foot*, existing at the generally attenuated posterior extremity of the body. In some forms (as in most of the free Rotifera) the foot is segmented and jointed in a telescopic manner, and it is generally provided with two terminal *styles* or processes, which act like pincers, and are so adapted for fixing the body. In Polyarthra and Triarthra elongated, symmetrical, and jointed, movable setae or bristle like organs exist. In general form the body varies greatly throughout the different families of Rotifera. Some (such as Melicerta) are termed *tubicolous*, and possess elongated bodies, which end in terminal discs, through which these animals attach themselves to fixed objects either singly or in colonies. In others the body may be more or less rounded. Stephanoceros and Plouscularia secrete a gelatinous tube, and exemplify fixed forms. In Melicerta a tubular case exists, specially secreted by the animal.

A highly specialized digestive system is usually developed, in the females at least, for the males appear to be entirely subsidiary in their development to the females, and may be viewed as simply beings destined for the performance of the reproductive function, and with little or no history or relations beyond those of 'locomotive testes'. Where typically developed the alimentary canal consists of the mouth already alluded to, which leads into a pharynx or 'buccal funnel,' containing the *mastax* or *pharyngeal bulb*, which in turn consists of a powerful masticatory apparatus. Four pieces thus usually exist in the dental bulb. Two lateral pieces termed the *malloxi* may be discerned, and two central ones termed the *incus*. These parts are in turn often described as consisting of other subdivisions. Thus each malloxi or upper jaw consists of a handle or *manubrium*, attached to which is the *uncus* or toothed blade. The lower jaws or *mandibles* each possess a fixed part or *fulcrum*, bearing two movable blades or *rami*. The free ends of the malloxi, through muscular contractions, work backwards and forwards on the incus and thus serve like hammers working on a central anvil, for the trituration of food. Gosse thinks the masticatory apparatus of Rotifera exhibits a homology with the dental apparatus of Insects. The oesophagus or gullet is short and dilated. A distinct stomach exists, and is also dilated internally, whilst a caecal or blind sac may be given off from each side of its anterior portion. The intestine, usually short, terminates in most cases in a *cloacal chamber*, which also receives the contents of the generative ducts, and appears to contain the central organ of the curious *water vascular system*. In some Rotifera the digestive system ends caecally, an anus being absent. And in the males, as already remarked, this system is abortive, and may be represented by a solid cord like structure. The alimentary canal is further suspended within a distinct perivisceral or body cavity, which contains a fluid (*chylaqueous fluid*), with corpuscles suspended in it.

No distinct organ of the circulation or *heart*, or system of vessels analogous to blood vessels, exists, unless the perivisceral cavity and its fluid may represent these structures, but in Rotifera, as in almost all Annuloida, a peculiar system of vessels and dilations forming the *water vascular system* is to be noted. In Rotifers this system may be best described as consisting, first, of a large vesicle which exhibits rhythmical movements of expansion and contraction, and which opens into the *cloaca*. From this vessel two tubes pass forward to the anterior parts and

along the sides of the body. These tubes finally end in curious ramifications near the wheel-disc, and usually give off in their course short, lateral diverticula or saccular prolongations. Each of these little sacs is pear shaped, and contains internally a single long cilium attached to the free extremity of the sac or vesicle, and playing in its interior. Some authorities maintain further that each little vesicle is in communication with the perivisceral cavity, and consequently with the corpusculated fluid which that cavity contains. The functions of this system of vessels are yet undetermined in an exact manner. But there appears every reason to suppose that it represents an excretory system, and that it is the analogue of the respiratory or urinary organs of other animals, or perhaps of both of these latter systems. In the absence of any distinct respiratory organs this view receives some support. Leydig says that water entering the perivisceral cavity by endosmosis mingles there with the digestive products which have similarly passed through the walls of the alimentary tract to form the 'chylaqueous fluid'. And he further views the system of tubes as serving to excrete the waste products derived from the perivisceral cavity, and as discharging these products into the contractile bladder, and thence into the cloaca. Gosse believes that the whole apparatus represents the urinary system, the cloacal bladder being, in his view, simply the urinary bladder. The males, it may be noted, although destitute of the distinct alimentary system of the females, nevertheless possess the water vascular system as in the latter forms.

The nervous system consists of a single ganglionic mass (of relatively large size when compared with the size of the body) situated near the trochal disc, on one (dorsal) side of the body, which has accordingly been named the *neural* side. The ganglion appears to be in general of bilobular shape. One or more pigment spots, presumed to possess the functions of eyes, are generally to be seen placed on the ganglion, whilst a *dilated pit*, and the *calcar*, or spur like process seen in many rotifers, are doubtless sensory organs, subserving the sense probably of touch. Occasionally a sac or vesicle containing limy or calcareous particles occurs in Rotifera, and this latter structure, if sensory at all, may be presumed to be auditory in function.

Reproduction is subserved by an ovary or female generative apparatus and a testis or male organ—the Rotifera being dioecious, and the sexes being invariably situated in different individuals. The males are much smaller than the females, and their relatively deficient organization has already been alluded to. The ovary is an elongated pear shaped structure, opening into the cloaca. Copulation between the sexes takes place. The embryos may undergo part of their development within the body of the parent. After a single act of impregnation by the males the female Rotifera appear to be capable of producing embryos for a lengthened period, and in summer young appear to be produced without contact with the male. No metamorphosis is undergone by the young form, but the egg undergoes complete segmentation or yolk division. An asexual method of reproduction, which may serve perhaps to explain the production of embryos by females without the presence of males, has been described in Rotifera, as consisting in the development of so called *winter ova* (see POLYCHAETA), which may be regarded most probably as modified internal buds.

One very remarkable feature of these curious forms consists in their power of being resuscitated after being subjected to repeated desiccations or dryings. Leeuwenhoek was familiar with this property, which exemplifies the phenomena of *potential* or *dormant vitality*. Professor Owen, in 1838, saw

a Rotifer at Freiburg revived, after having been preserved in dry sand by Schulze for four years, and Dr. Carpenter has dried and revived the same Rotifers some half dozen times. Any one in fact, with a good microscope, can satisfy himself of the facility with which the Rotifera may be completely desiccated (as they are in nature by the summer sun drying them up from the pools in which they exist), and yet be completely restored to their wonted activity on the addition of a little moisture. We may presume that, in dormant vitality, as exemplified by these forms, life exists in such a state as does that of the half drowned man—namely, in a state of suspended animation—waiting only the restoration of the necessary conditions to recall it.

The classification of the Rotifera is still a matter whereon the skill of naturalists must be exerted. Various systems of arrangement, all of which are more or less abstruse in character or inapplicable in details, have been from time to time brought forward. Of the four or five orders now usually recognized the largest is Plouma, comprising the two sub orders Loricata (genera *Brachionus*, *Notcus*, *Pterodina*, *Colurus*, *Euchlanis*, *Salpina*, *Dinocharis*, *Ratulus*, &c.), and Iloricata (genera *Microcodon*, *Asplanchna*, *Syncheta*, *Triarthra*, *Hydatina*, *Albertia*, *Taphrocampa*, *Notommatia*, &c.). The order Bdelloida contains *Rotifer* and a few other genera, and the other orders are Rhizota (*Floscularia*, *Strophoceros*, *Meliceria*, *Trichosphara*, &c.), Scutopoda (*Pedalion*, *Uterthra*), and Scisonacea (*Scison*, *Paraseison*, &c.).

ROTROU, JEAN, a French dramatist, born at Dreux in 1609, was the most distinguished dramatic writer among the predecessors of Corneille. Of his thirty-six tragedies, tragicomedies, and comedies only one—the tragedy of *Venceslas* (as revised by Marmontel)—keeps the stage, the plot of this piece is borrowed from the Spanish of Roxas. Rotrou endeavoured to elevate the tone of the drama by giving it a moral purpose, and his heroes and heroines are made to utter Christian sentiments. Richelieu, who granted him a pension, could not prevail upon him to assist in decrying the Cid of Corneille. In 1650 Rotrou fell a victim to a pestilential disease, to which he nobly exposed himself in the discharge of his official duties as one of the principal magistrates of his native place. His *Œuvres* appeared at Paris in 1820 in five vols.

ROTTECK, KARL WILHELM RODEKER VON, a German historian and publicist, was born at Freiburg in Baden, 18th July, 1775. He was educated at the university of his native town, where his father was perpetual dean of the medical faculty. Although by profession an advocate he devoted the greater part of his attention to the study of history, and in 1798 was appointed professor of that department in Freiburg University, a chair which he exchanged for that of natural and international law in 1818. He soon became an industrious writer on public law, and his numerous newspaper articles and pamphlets on representative bodies, on the danger of maintaining large standing armies, and other subjects, attracted notice. In 1819 he was chosen by his university as their representative in the first chamber of the states of Baden, and soon proved an ardent champion of political reform. He was one of the founders of *Der Freisinnige*, a journal with strong democratic leanings, and brought upon himself the displeasure of the conservative party, who compelled him to resign his professorship, and discontinue the editing of all public prints for five years. The liberal party looked upon him as a martyr, and addresses and presents were sent to him from all parts of Germany. His native town elected him mayor, but the government

refused their sanction, and upon being chosen a second time he resigned in order to preserve public order. An attempt was also made to exclude him from the second chamber of the states, to which his fellow citizens had sent him as their representative in 1830, but this was ineffectual, and he continued to hold his seat till his death, 26th November, 1840. Shortly before that event he had been re-admitted as a lecturer at the university, but a severe illness and a keen sense of the wrongs he had suffered proved stronger than the benefit of the satisfaction such a tardy step on the part of the government could have given him. As a historian Rotteck is widely known by his *Allgemeine Weltgeschichte*, published in nine vols. between 1813 and 1827, the twenty-fourth edition, with two vols. of continuation by Steger and Hermes, was published at Brunswick in 1863. Numerous translations of the original work, or of an abridgment published by Rotteck under the title of *Auszug aus der Weltgeschichte*, have appeared in most of the languages of Europe. It is a critical narrative of prominent events written from a liberal point of view and in a clear and attractive style. Among his other works are, *Lehrbuch des Vernunftrechts und der Staatswissenschaften* (two vols., Stuttgart, 1829–30), *Lehrbuch der ökonomischen Politik* (Stuttgart, 1835), *Kleinere Schriften* (three vols., Stuttgart, 1829–30), and, conjointly with Welcker, a *Staatslexikon* (fifteen vols., Altona, 1834–44).

ROTTENBURG, a town of Württemberg, in the circle of the Schwarzwald, beautifully situated on the left bank of the Neckar, about 7 miles south-west from Tübingen. The castle, erected in 1216 by the counts of Hohenberg, is now transformed into a prison. Another important building is the R. Catholic cathedral. There are numerous hop-fields, orchards, and vineyards in the neighbourhood, and some manufactures are carried on. The place stands on the site of the Roman station *Sumalocenna*, and remains of a magnificent aqueduct are to be seen, while coins and other ancient remains are occasionally found. Pop. in 1895 6855.

ROTTENSTONE, a decomposed stony substance, consisting, according to an analysis by R. Philips, of alumina, 86, carbon, 10, and silica, 4. It is used for polishing metallic surfaces, glass, &c., and is chiefly found in Derbyshire and South Wales and near Albany in New York state. It is either grayish, blackish, or reddish brown in colour, and is soft and easily scraped to powder.

ROTTERDAM, after Amsterdam, the largest city and the chief seaport in the Netherlands. It lies in the province of South Holland, 36 miles south-west of Amsterdam, with which it is connected by railway, and on the right bank of the Nieuwe Maas, which is navigable, but the city has more direct communication with the sea by means of the canal called the Nieuwe Waterweg (12 miles long). The Maas is crossed by two bridges, one a great railway bridge and another for carriages and foot passengers. The city is intersected by many canals, communication across them being maintained by innumerable draw bridges, and it is traversed by the Rotte, a small stream, at the junction of which with the Maas there is a large dyke or dam, whence the name Rotterdam. Many of the canals are planted with trees, imparting to them a pleasing aspect, and several of them are so deep as to form excellent harbours, and admit the largest ships to lie alongside the warehouses in the middle of the town. The water in them is kept fresh and clean by the flow and ebb of the tide, which rises 10 to 12 feet. Along the river, which opposite the town is 30 to 40 feet deep, is a fine quay, 1½ mile long, called the Boompjes (Little Trees), from a line of elms, planted in 1616, now grown to a large

size Many of the houses are quaint-looking gabled edifices, overhanging their foundations a considerable way, and the principal buildings being along the chief canals or 'havens', the other streets have mostly a less attractive appearance The chief railway station stands on an elevated foundation near the centre of the town, here also the principal tramways diverge

There are several market places, but none of them is very large, among them may be mentioned the Groote Markt (Great Market), in the centre of which is a statue in honour of Erasmus, who was a native of the city Rotterdam possesses a number of important buildings, including the town hall, court houses, exchange, post and telegraph office, Boymans museum or gallery of pictures, academy of fine arts, art industrial museum, theatres, banks, fish market, arcade, &c There are numerous churches, of various denominations, including Calvinistic, Roman Catholic, French, English, Scotch, &c The oldest Calvinistic (originally a Roman Catholic) church is the Groote Kerk, or church of St Laurens, founded in 1414, and finished in 1472 It contains monuments to the admirals De Witt, Kortenaar, and De Brakel, and has one of the finest organs in the country There is a general hospital, and several others, and many friendly and benevolent societies, a Latin school, called the Erasmus Gymnasium, schools of medicine and navigation, and numerous other schools There are zoological gardens and a public park.

The inhabitants of Rotterdam are chiefly engaged in commerce, which may be called the mainstay of the city It sends to the Dutch eastern possessions and to the West Indies provisions of all kinds, spirits, wines, mineral waters, and manufactured goods, in return for coffee, sugar, tobacco, cocoa, spices, cotton, dye woods, &c To Great Britain, with which it carries on an extensive and lucrative trade, it sends cheese, butter, margarine, flax, linseed, garden seeds, clover seed, fruits of various kinds, gin, large numbers of sheep and cattle, &c With America and with France, Spain, Portugal, and other states of Europe, a good trade is likewise carried on Along the Rhine and by railway it sends inland sugar, coffee, cotton, dye woods, indigo, spices, tobacco, rape seed, petroleum, butter, cheese, fish, &c, in return for wheat, rye, Moselle and Rhine wine, pottery-ware, chemical stuffs, &c The tonnage entered in 1900 amounted to an aggregate of 5,816,928 tons, the arrivals being largely by the Nieuwe Waterweg, through the Hook of Holland Rotterdam has many distilleries, breweries, vinegar works, tan works, candle works, dye works, extensive sugar refineries, bleach fields, cigar manufactories, chocolate works, margarine works, chemical works, corn, oil, and other mills, ship building yards, &c Pop. in 1900, 332,185

ROTTI, ROTTE, or ROTTO, an island in the Indian Archipelago, off the south west end of Timor, from which it is separated by Rotti or Semao Strait, about 5 miles wide, lat (Buka Bay, south east side), 10° 53' s., lon 123° 5' e., greatest length, from east to west, 36 miles, breadth from north to south, about 11 miles It has a bold, rocky coast, and is of moderate height, with undulating hills, on the south east side of the island there is a good and safe harbour, called Buka Bay, from which horses, buffaloes, pigs, goats, deer, poultry, bees' wax, and honey are exported. One of the most valuable products of the island is the lontar or palmyra palm, the juice of which is one of the principal articles of food Cocoa nut, plantain, banana, and mango trees abound. Rotti produces rice, maize, cotton, sweet potatoes, and excellent timber of various sorts, buffaloes, large and hardy horses, goats, sheep, and pigs are plentiful,

much wild honey and edible nests are collected and exported. Hurricanes and earthquakes are not uncommon The island belongs to the Dutch, and has a population of about 75,000 The natives are a fine looking race, and are supposed to have originally come from Java

ROTTWEIL, a town of Württemberg, in the circle of the Schwarzwald, on a height above the left bank of the Neckar, 49 miles s.s.w. from Stuttgart Rottweil appears to have been at first a Roman colony, and a number of valuable and interesting antiquities have been found in and around the town At a very early period it rose to the rank of an imperial free town Pop (1895), 6961

ROTUMAH, an island of the Pacific, nearly 300 miles n.n.w. of Fiji, 4 to 5 miles wide and about 16 long It is hilly, of volcanic origin, and generally fertile, producing cocoa nuts in especial perfection, and exporting quantities of copra It was ceded to Britain by the native chiefs in 1879, and is governed by a commissioner as a dependency of the Fiji group The natives are now Christians, and number about 2600 They are a peaceable and well behaved people, many of them able to speak English The men make excellent sailors.

ROTUNDA (L. *rotundus*, round), any building round within and without, as the Pantheon, in Rome

ROUBAIX, a town in France, in the department of Nord, 6 miles north east of Lille It is a clean, regular, well built town, but has few public edifices deserving of particular notice, though we may mention the church of St Martin, the town house, the theatre, and an hospital It has recently risen to great importance by its manufactures of woollens and other tissues, its worsted and cotton mills, wool combing works, dye works, tanneries, &c As a central manufacturing locality, surrounded by populous places (such as Tourcoing) engaged in similar industries, it attracts purchasers from all parts of France, and has also a large trade Pop (1886), 89,781 (1901), 124,660

ROUBILLAC, LOUIS FRANÇOIS, a sculptor, was born at Lyons in 1695, and settled in England in the reign of George I In the absolute dearth of native talent which prevailed at that period he long stood at the head of his profession He executed a statue of Handel for Vauxhall Gardens, one (for Garrick) of Shakspeare, now in the British Museum, and another of Sir Isaac Newton, erected at Trinity College, Cambridge, but was chiefly employed on sepulchral monuments He wrote satires in his native language He died in London in 1762

ROUBLE, a silver coin, the standard of money in Russia, containing 278 grains of fine silver, and equal to about 3s 2d of British money In actual circulation there is little but paper money, valued at from ten to twenty per cent below its nominal value. A rouble is divided into 100 copecks Half and quarter roubles, and fifth, tenth, and twentieth parts of a rouble, are coined in silver, gold coins of the nominal value of three roubles (the imperial ducat) and five roubles (the demi imperial) are also coined

ROUEN, a town of France, capital of the department of Seine Inférieure, agreeably situated on the Seine, 87 miles n.n.w. of Paris by railway It stands in a valley on a gentle acclivity facing the south, and is in the shape of an irregular oval, the contour of which is marked out by the site of the old ramparts, which have been levelled down and converted into finely planted boulevards In addition to the town proper, which stands on the right bank of the river, there are several suburbs Of these that of St Sever, on the left bank, is the most extensive, it is now connected with the town by two bridges. When viewed from the adjoining heights, particularly from

the hill of St. Catharine on the south-east, whence it is seen to the greatest advantage, no provincial town in France presents a more magnificent and venerable aspect. A closer inspection does not tend to heighten the impression which a distant view produces. The streets, though long and tolerably straight, are narrow, dark, and dirty, and the houses, for the most part of wood and often faced with slate, are poorly built, and so lofty and crowded as to exclude a free circulation of air. Many of these houses, however, are interesting from their antiquity, and in the western part of the town, which is of more modern construction, there are several handsome streets, with elegant mansions of stone. To these must be added the rows of houses along the magnificent quays by which the banks of the river are lined. Among the public edifices the first place is due to the cathedral, a vast and imposing structure, commenced under Philippe Auguste in 1220, and gradually completed during a succession of centuries, hence varying much both in the style and merits of its architecture, but still one of the most splendid basilicas of which France can boast. Its west front, forming one side of the fruit and flower market, is flanked by two lofty towers, in different styles of architecture, and is so incrustated with images and sculptures as almost to resemble a piece of rock work. The interior is 435 feet long, 104 feet broad, and 89½ feet high. It is in the early pointed style, and has three remarkably fine rose windows in the nave and transepts. The choir has exquisitely carved stalls and some beautifully painted glass, and on its pavement are small lozenge shaped tablets of marble, marking the spots where the heart of Richard Cœur de Lion, and the bodies of his brother Henry, his uncle Geoffroy Plantagenet, and John, duke of Bedford, regent of Normandy, were interred. The other edifices most deserving of notice are the archbishop's palace, immediately adjoining the cathedral, the abbey of St. Ouen, with a church, regarded as one of the most perfect Gothic edifices in the world, with a tower 260 feet in height, wholly composed of open arches and tracery, and terminating in an octangular crown of *fleurs-de-lis*, the church of St. Macloù, a fine specimen of florid Gothic, the Tour de la Grosse Horloge, a square Gothic tower, with pointed windows, containing the principal clock of the town, the hotel de ville, originally part of the abbey of St. Ouen, with a modern front and Corinthian colonnade, the palais de justice, a Gothic edifice of the fifteenth century, remarkable alike for the delicacy and boldness of its construction, the Hôtel de Bourgtheroulde (15th century), with fine reliefs, the Musée or picture-gallery (built in 1888), containing a large collection of paintings, particularly of the French school, and the Anciennes Halles, or market buildings. There is a municipal library containing 130,000 volumes and 2500 MSS., a museum of antiquities, and another of natural history. In the Place de la Pucelle is a monument to the Maid of Orleans, on the spot where she is said to have been burned. There is also a recent statue of this heroine, and others of Corneille, Boieldieu, Napoleon, &c. Rouen is the see of an archbishop, the seat of various courts, and possesses a chamber of commerce, an exchange, mint, theological school, medical school, school of science and literature, a lyceum, academy of science and art, school of painting, sculpture, and architecture, &c.

The staple manufactures are cottons, in a great variety of forms, produced to such an extent as to make Rouen the Manchester of France. A class of cotton goods made with dyed yarn are known as *rouenneries*. The other principal articles are woollen goods, machinery of various kinds, confectionery, soap, chemicals, earthenware, &c. There are nu-

merous spinning mills, dye-works, bleach-fields, tanneries, sugar refineries, copper and iron foundries. The situation of the town on the railway from Paris to Havre, and on an important navigable river accessible by large vessels, is very favourable for trade. The principal articles are corn, flour, wool, cotton, coal, petroleum, wine, brandy, colonial produce, and the various articles of its manufacture.

Rouen is a place of great antiquity, and existed before the conquest of Gaul by the Romans, under whom it took, and for several centuries retained, the name of *Rotomagus*. In the ninth century it was taken and pillaged by the Normans, who made it their capital. After the Norman conquest it long continued in the possession of the English, who finally lost it in 1449, eighteen years after they had disgraced themselves by the judicial murder of Joan of Arc. Among eminent men born here are Cornille, Fontenelle, Boieldieu, and Flaubert. Pop (1886), 107,163, (1901), 115,914.

ROUGE, a very fine red powder, usually prepared by calcining ferrous sulphate (green vitriol). It is used by jewellers, &c., for polishing purposes. The cosmetic rouge is quite different from this. It may be prepared from safflower mixed with finely powdered French chalk, or its basis may be carmine or vermilion.

ROUGE CROIX. See *POURSUIVANT*.

ROUGE DRAGON. See *POURSUIVANT*.

ROUGE ET NOIR (French, 'Red and Black'), TRENTE UN ('Thirty one'), or TRENTE ET QUARANTE ('Thirty and Forty'), a modern game of chance, which superseded *faro* and *biribi* in France about 1789, and which soon found its way into all the gaming houses of the Continent. It was prohibited by law in France in 1838 and in Germany in 1873. The game is played upon a table, which is covered with green cloth, and is narrower at the centre than at the two rounded ends, having thus an outline nearly like that of the body of a violin. The table is divided into four sections, each of which are marked in the centre with a diamond, the diamonds being alternately red and black. The quarters are further separated, two by two, by bands which cross the table at its narrowest part, and at each end of the table are concentric yellow bands. The players being assembled, the *tailleur* (one of the dealers who manage the tables, keep the bank, and watch the players) takes his place at the centre of the table, opposite the *croupier* (another *tailleur*), and opens six packs of fifty two cards each, which are counted and shuffled by several *tailleurs*, and then returned to the first *tailleur*, who presents them to one of the players to be cut. This being done a row of cards is dealt for *noir* until the number 31 is reached or passed. The court cards count ten each, the others according to their number of pips. Another row is similarly dealt for *rouge*. The row that counts nearest to 31 wins. If both count the same number of points it is a *refait*, and the *tailleur* must make a fresh deal from the stock of undealt cards still on the table. But if both the rows first dealt reach the number of 31 it is a *refait de trente et un*, and the bank claims the half of the stakes. There are four chances in the game, *rouge*, *noir*, *couleur*, and *inverse*, and the player chooses his chance by depositing his stake on either of the two red diamonds for *rouge*, on either of the black diamonds for *noir*, on one of the transverse bands for *couleur*, and on one of the concentric yellow bands for *inverse*. How the stakes are decided for *rouge* and *noir* we have already seen. *Couleur* wins if the first card turned up by the *tailleur* in the deal is of the winning colour, red or black, if the case is contrary *inverse* wins. The game would be an equal one between the players and the bank were it not for the advantage the latter

has when there is a *refait de trente et un*, which is estimated to occur once in forty four deals, or after deducting six or seven probable refaits of other numbers there remain still thirty eight material deals, in which, on the average, the *refait de trente et un* will occur once, this gives the bank a percentage of $\frac{1}{4}$ on all the sums staked, or about 1½ per cent. In spite of the mathematical proof of the advantage of the bank many enthusiastic gamblers have great faith in their supposed infallible systems of breaking it, and there is no doubt that by what is called a run of good luck considerable winnings may be made, owing to the small percentage in the bank's favour, but the inexorable refait will give the bank success in the end. The principal systems are the *martingale* and the *paroli*. In the former if the player wins he picks up the amount, but if he loses he continues to double the stake until the colour he stakes on wins and then he regains at one stroke all his losses, and the original stakes besides. But this mode of staking is prevented by limiting a single stake to about £100, and the lowest stake being 1s the player can only double twelve times before reaching that sum. Besides the possibility of a *refait de trente et un* during the *martingale* upsets the whole theory. In the *paroli* the player adopts the reverse system. When he loses he again puts down a single stake, but when he gains he doubles it, and keeps on doing so as long as he goes on winning. Were he to win twelve times in succession starting with 4s, he would be a gambler by £400, but the probabilities are that he would lose as much in small sums, and in addition, the stakes claimed by the bank for the refaits that would be certain to occur in such a long course of play. Take roulette, the game is still played at Monte Carlo. See ROULETTE.

ROUGET DE LISLE. See MARSHALL VINE.

ROULERS (Flemish, *Rousselaere*) a town of Belgium, in West Flanders on the Mandel, 17 miles south of Bruges. It has wide and regular streets, well built houses, a large public square, a handsome town house, a parish church with an old tower, and a fine college. The chief industrial establishments are breweries, distilleries, tanneries, oil and salt works. Linen and cotton goods, hats, soap, glue, elucory, and tobacco are also manufactured and there is an important trade. Pop. (1900), 23,238.

ROULETTE (French, 'Little Wheel') a game of chance introduced about the end of the 18th century into Paris where it became the favourite gambling game until it was suppressed there in 1838. It shared the same fate along with rouge et noir (which see) at the German watering places in 1873. The roulette table is of an oblong form covered with green cloth with a deep concave depression in the centre of about 2 feet in diameter, all round this cavity are cells, thirty seven on thirty eight in number, painted alternately red and black and numbered 1 to 36, the thirty seven celled tables which were used at Wiesbaden and Homburg had their remaining cell marked with a single zero (0) the thirty eight celled tables of Baden Baden and Paris had cells for the single and double zero (00). From the centre of the depression rises an axis on which revolves a disc the upper surface of which has a gentle slope towards the edge, which is on a level with the circumference of the depression. The cross like handle by which the disc is set in motion rises from the upper extremity of the axis. On the margins of the two remaining portions of the table are painted the words *pair*, *passee*, *noir*, *impair*, *manque* *rouge*. The numbers 1 to 36 with the zeros arranged in three columns, occupy the rest of the space at each end of the table. Those who manage the table and keep the bank are called *tailleurs*. The game is thus played a *tailleur*

sets the movable disc in motion, and at the same instant throws an ivory ball upon it in an opposite direction to its revolution, the ball goes round once or twice, and at last drops into one of the numbered cells above mentioned the cell into which it drops determining the gain or loss of the players. A player may stake his money on any of the numbers or zeros, or on the *pair*, *passee*, *noir*, *impair*, *manque*, or *rouge*, and this he does by laying his stake on the part of the table marked by the chosen number or word. If he has chosen a number or zero corresponding to the one into which the ball drops he receives thirty-six times his stake (his stake and thirty five times more), if, however, he has selected two numbers, he receives only eighteen times his stake, if he has chosen three numbers twelve times, and so on. He may choose all the twelve numbers in one of the columns of figures (which he does by putting his money at the foot of the column), and if one of these numbers is successful he gains three times his stake. Those who prefer staking on *pair*, *impair*, *passee*, *manque*, *rouge*, or *noir*, if successful, receive their stake and as much more. *Pair* wins if the ball drops into a cell marked with an even number, *impair* if it falls into a cell with an odd number, *manque* if into any cell numbered 1 to 18, *passee* if into cells 19 to 36, *rouge* if into a red cell and *noir* if into a black one. Should the ball fall into any of the cells marked with the zeros the stakes of the players who risk the last mentioned six chances are either equally divided between the bank and the players or are 'put in prison', in the latter case, the next trial decides whether they are to go wholly to the players or to the bank. The advantage of the bank lies in the fact that while (in the case of a single zero) there are thirty seven cells, the amount returned to the winners is only at the rate 35 to 1 to make the game equal it should be 36 to 1. This gives the bank $\frac{1}{36}$ or about 2½ per cent on the gross stakes laid on the numbers, in the case of *pair*, *impair*, *manque*, *passee*, *rouge*, and *noir* when the ball falls into the zero cell (which will occur on an average once in thirty seven times) the bank's profit is further increased by 1½ per cent. With the double zero in addition the profits of the bank are considerably higher.

ROUMANIA, or RUMANIA, a kingdom of south-eastern Europe embracing what used to be called the Danubian principalities, or provinces of Moldavia and Wallachia, to which has been added the province Dobruddsha, on the Black Sea. It is surrounded by Russia, the Black Sea, Bulgaria, Serbia, and Austria-Hungary, total area, 50,720 square miles. The capital is Bucharest, the next largest towns are Jassy and Galatz.

Moldavia is bounded on the north and east by Russia from which it is separated by the Pruth and the Danube, on the south by Wallachia and on the west by the Austrian provinces of Transylvania and Bukovina. It is about 220 miles from south east to north west, and about 100 miles east to west throughout the greater part of its length, area, about 15,000 square miles. The general surface excepting the western frontier may be represented as composed of undulating plains of great beauty and vast extent, covered with luxuriant crops of grass. Towards the west the plains are succeeded by hills and valleys formed by detached branches of the great Carpathian chain, which separates this country from Transylvania. It is watered by several considerable streams, the largest the Sereth traverses it longitudinally nearly throughout its entire length. The other larger rivers are the Bistritz, Bulat, Moldava, Tatros, and Tazleu, all affluents of the Sereth, in its turn a tributary of the Danube, and all flowing north to south. As already mentioned, it has also the Pruth on its

eastern border, and, for a short distance, the Danube on its southern limit. It possesses considerable mineral wealth, of which, however, little advantage has been taken. Rock salt abounds in the vicinity of the Carpathian Mountains, asphalt is found in several parts, and a great quantity of saltpetre is produced, chiefly in the northern part of the country, while in the sands of several of the rivers, particularly the Bistritz, small quantities of gold are found. Many parts of the country are poor and uncultivated, and but thinly inhabited, while others support a numerous population, and are remarkable for their beauty and fertility, other portions again are covered with extensive forests. The climate is warm in summer, but frequently severe in winter. In hot seasons, and in the neighbourhood of marshes, it is unhealthy. The principal products are wheat, barley, millet, and maize, wine and tobacco are also produced in considerable quantity—some of the former of excellent quality, particularly the white wines of the mountains, which are much prized. Agriculture, however, is but indifferently understood, though implements of husbandry of the modern type are being introduced. But by far the greater portion of the country is in pasture, on which vast numbers of cattle, horses, sheep, and goats are reared. Large herds of hogs also are fed in the forests. The Moldavians pay considerable attention to their breed of horses, great numbers of which are sent into Austria and Prussia for the service of the light cavalry. The cattle in general are superior to those of Eastern Europe, and are driven for sale as far as Vienna, and even to Breslau in Silesia. The wild animals are stags, wild boars, bears, wolves, foxes, wild goats, hares, and martens. Bees also abound. The manufactures of the province are very trifling, and are calculated for home consumption alone. Its foreign trade, however, through its port of Galatz, on the Danube, is considerable and is increasing. The principal exports are wheat—large quantities of which are brought down the Danube from Hungary—maize, masts and spars, tallow, wine, planks and deals, preserved beef, bagging stuff, &c. Imports, manufactured goods and yarns, sugar, coffee, tin, iron, oil, dried fruits, lemons, tobacco, caviar, salted fish, skins, &c. But there is, besides this, a large internal or inland traffic chiefly in cattle, with Russia, Austria, and Turkey.

WALACHIA, or Wallachia, is bounded on the north and north-west by the Carpathians, separating it from Transylvania and Hungary on the west and south by the Danube, separating it from Servia and Bulgaria, on the east by the Danube (or, including the Dobrudsha, by the Black Sea), on the north-east by Moldavia, from which it is chiefly separated by the Sereeth and its tributary the Milkov. It is thus remarkably well defined by great natural boundaries. It is of an irregularly oval form, with a length from west to east of 260 miles and a breadth of 120 miles, area, about 29,500 square miles. Its surface may be regarded as a vast inclined plane, sloping from the Carpathians towards the Danube. It embraces Little Walachia in the west, and Greater Walachia in the east. Among the mountains of the north and west, the elevation, which averages from 3000 feet to 4000 feet, rises in particular summits to 7000 feet, and in Mount Negoï, north-west of Kimpolung, exceeds 8000 feet, but this elevation is soon succeeded by a region of hills and undulating plains, and finally sinks down into extensive flats, often swampy, and fringed near the banks of the Danube by a chain of shallow lakes. The most valuable mineral of Walachia is salt, the mines of which seem almost inexhaustible. Petroleum and asphalt are also abundant, sulphur is found in more limited quantities. The only metal of consequence is copper, which has been

worked to some extent, gold is washed from the sands of several streams. The drainage belongs to the basin of the Danube, which receives it on its left bank, both directly and by numerous affluents, particularly the Shyl, Aluta, Argish, Jalomitza, and Sereeth. The climate in the more mountainous districts is severe, and even on the plains the winter continues long. The Danube and its tributaries are regularly frozen over for about six weeks. The soil is remarkable for its fertility, and with few exceptions the whole principality admits of being cultivated like a garden. With very imperfect culture wheat, barley, and maize are everywhere raised in abundance. Tobacco, hops, and flax are also extensively grown, the vine thrives well, and there is a profusion of all ordinary fruits. Cattle, sheep, and goats are reared in vast numbers. Manufactures are insignificant, the trade is principally in raw produce, exchanged against coffee, sugar, wines, and various manufactures. The Dobrudsha is mostly a land of steppes and marshes, unhealthy, and uncultivated. It is intersected by the important Sulina mouth of the Danube.

Since 1881 the ruler of Roumania has had the title of King, in accordance with the decision of the Roumanian parliament. Previously the title was Prince, or in Roumanian *Domnii* (*l. dominus*, lord). The present ruler was elected by the people, but the dignity is hereditary. There are two legislative houses a senate of 120 members elected for eight years, and a chamber of deputies of 183 members elected for four years. The members of both chambers are chosen by indirect election, the first voters choosing electors, and these in their turn the deputies. A deputy must either belong to a learned profession, to the military or civil service, or have an annual income of about £400, and must be twenty-five years of age. All citizens of full age and paying taxes are electors. The sovereign has a suspensive veto over all laws passed by the two chambers. The executive is in the hands of the sovereign assisted by a council of seven members, the heads of the departments of the interior, of finance, of war, of foreign affairs, of justice, of agriculture, commerce, and public works, and of public instruction and worship. Judges are removable at the pleasure of the superior authorities. The legal codes are founded on the civil law and customs of the two provinces, but though several reforms have been effected in the system of jurisprudence much yet remains to be done, especially in the administration of the law, which is said to be very unsatisfactory and corrupt.

Religion and Education.—The established religion is that of the Greek Church, to which about 97 per cent of the population belongs. Every village has a small church or chapel, with one or more priests, who act as curates. The ecclesiastics of this order are selected from among the people, from whom they differ little in attainments and appearance, and whose vocations they follow when not engaged in their clerical duties. At the head of the clergy stand the metropolitan Archbishops of Moldavia and Walachia, the latter of whom is primate of Roumania. Each bishop is assisted by a council of clergy, and has a seminary for priests. In 1863 the national finances were so low that the government was compelled to appropriate the estates of the monasteries, whose revenues amounted to about a third of that of the state, allowing in return a sum of about £700,000 for the support of the religious communities. It was determined that the balance should be devoted to the support of schools, hospitals, the relief of the poor, &c. Roumania possesses 4000 elementary schools, fifty-four high schools, eight normal schools, and two universities, besides other special schools.

Education is gratuitous and compulsory (where schools exist), but is still very backward.

Army and Navy—The military forces of Roumania are divided into five classes: 1, the permanent army, with its reserve; 2, the territorial army, with its reserve; 3, the militia; 4, the civic guard; and 5, *levies en masse*. Every male inhabitant, from the age of twenty one to forty six, must serve three years in the permanent army in active service and five years in its reserve, or five years in the territorial infantry and three years in its reserve. The active service in the cavalry of the territorial army lasts four years, and is followed by four years in its reserve. Whether a young man enters the permanent or the territorial army is determined by lot. Those who for some sufficient reason have not been subjected to the conscription form part of the militia, and those who have finished their term in the permanent or the territorial army also enter the militia till the age of thirty six. After this age, in the country they enter the *levies en masse*, in the towns the civic guard. The total strength in times of peace of the permanent army is 60,000 men and 3280 officers, with 390 pieces of ordnance. The territorial army has a total strength of 72,000 men. The militia has a total strength of 83,000 men. The effective force of the civic guard and the *levy en masse* is not definitely fixed, but altogether Roumania can put into the field about 200,000 men. The navy is insignificant, there being only one armoured vessel of any consequence.

Population and Language—The population of Roumania, according to the census of 1899, was 5,912,520, among whom the Roumanians proper numbered 5,469,036. The Roumanians claim to be the descendants of a colony of Romans located here by the Emperor Trajan, and call themselves *Romani*, hence the name of Roumania, which is now universally adopted by the natives as the name of the united principalities. The race is, however, far from being an unmixed one, being modified by Greek, Gothic, Slavic, and Turkish elements. This mixture makes itself apparent in their language, three fourths of the words of which, however, are almost pure Latin, among words in common use are, *apa* (*La aqua*) water, *pane* (*La panis*), bread, *alby* (*La albus*), white, *negru* (*La niger*), black, and so on. The conjugations also of the verbs, which are four in number, correspond exactly to the four conjugations in Latin. For a long time Greek was the language spoken by the court and the upper classes, but latterly this language has been largely superseded by the French. Besides the Roumanians proper there are in Roumania about 300,000 Jews, 200,000 Gypsies, 85,000 Slavs, besides Germans, Magyars, Greeks, &c. There are also large numbers of Roumanians inhabiting Hungary, Transylvania, Bessarabia, and elsewhere. The Roumanians are in general strong and stoutly built, with black hair, brilliant eyes, and a complexion similar to that of the Italians.

Social Condition—Since the Crimean war and the introduction of railways great changes have taken place in the condition of the people. The peasants were never, properly speaking, serfs, but being compelled to work gratis for the proprietor a certain number of days every year they became fixed to that part of the country in which they were born. They are now not only perfectly free but each head of a family received during the late Prince Couza's reign a small portion of land, of which he became absolute proprietor, the landlord having been compensated by receiving bonds bearing 10 per cent interest. Their dwellings are generally of a wretched description. Many of the towns are merely agglomerations of large houses, the residences of the boyards, sur-

rounded by the huts of their dependants. The streets are ill paved, or, as is most generally the case, not paved at all, and are disgustingly filthy, the roads, of which there are too few, are in most cases in a wretched state. Agricultural labour, the chief employment of the inhabitants, is cheap, as most of the labourers are so poor that they engage for work to be done three years afterwards, in order to obtain advances of money. More than three fourths of the population are peasants. Handicraftsmen are comparatively few in number, as the peasant usually builds his own house, and makes his own furniture and other utensils. In Moldavia there are said to be about 3000 boyards, besides an extensive lower nobility, in Walachia they are still more numerous, every twenty eighth man being a nobleman. There is no native middle class, and the higher ranks of society have only the law open to them as a profession. The commerce of the country is in the hands of Jews and foreigners. The staple food of the inhabitants is maize, the common beverage is wine, which is produced in great quantities though mostly of inferior quality. This, however, is owing altogether to the manner in which it is made, and, as already stated, some good wine is also produced. The common people are on the whole good humoured, sober, and cleanly, murder and robbery are almost unknown.

Commerce, Revenue, &c.—The total value of the imports into Roumania in 1900 amounted to 216,985,878 lei or francs, or about £8,679,435, the exports amounted to 280,000,431 lei, or about £11,200,000. In 1900 the exports to Britain alone amounted to £675,000, the imports of British home produce to £1,226,000. The principal article of export is grain, chiefly wheat, maize, and barley. The chief article of import from Britain is cotton goods. The industry of the country has been greatly benefited by the construction in recent years of several lines of railway and telegraph. In 1869 the first line, 42 miles in length, was opened from Bucharest to Giurgevo on the Danube, and in subsequent years a net work of railways was completed connecting the capital with the most important Roumanian towns as well as with adjacent countries. There were in 1901 about 2060 miles of railway open, all of the lines being now under the control and working of the state. Other lines to the length of about 930 miles are in course of construction. The estimated state revenue for 1902-1903 was £8,740,000, and the expenditure a like sum. The public debt in 1901 amounted to £57,000,000.

History—Roumania formed an important part of the Dacian territory which was conquered by Trajan and formed into a Roman province in 106 A.D. It became the battle field of the Goths, Huns, Bulgarians, Magyars, and Poles, who in succession held for a more or less lengthened period possession of the country. All these races left some traces of themselves among the Romanized Dacian inhabitants thus contributing to form that mixed people who in the eleventh century were converted to the Christianity of the Greek Church. About that epoch the Kumans, a Turkish tribe established in Moldavia an independent kingdom. Two centuries later it fell into the hands of the Nogai Tartars, who so desolated the country that only in the mountains and forests was left any trace of the native population. Towards the end of the thirteenth century Radu Negru of Fogarash, a petty Transylvanian chief, took possession of part of Walachia, divided it among his boyards, founded a senate of twelve members and an elective monarchy and in the course of time conquered the whole province. About the middle of the following century Bogdan, a Hungarian chief, made a successful attempt to re-peopple Moldavia. Struggles for the

ruling power, civil and foreign wars, and invasion by the Tartars induced the Roumanians in the beginning of the sixteenth century to place themselves under the protection of the Sublime Porte, and the boyards were gradually deprived of their power to elect their own ruler, whose office was bought and sold at Constantinople. Woiwodes of various nationalities were now successively appointed, but their rule proved inefficient in establishing peace and subjection to the sultan, as the boyards never lost an opportunity of making known their dissatisfaction. One of the most distinguished foreigners was Basil Lupulo, a Greek of Epirus, who promoted civilization and learning, but was deposed in the middle of the seventeenth century. From 1732 to 1822 the country was governed, or rather misgoverned, by Fanariot princes, who merely farmed out the revenues, enriching themselves and impoverishing the land. A considerable number of the boyards, through intermarriage with the Fanariots, were more than half Greek by descent, the court language was Greek, and the religious and political sympathies of the country lay in the same direction. In 1802 Russia succeeded in erecting a sort of protectorate over the principalities, and in 1821 a desperate struggle to throw off entirely the Turkish authority almost desolated the land. In 1822 the sultan was compelled by Russia to select the princes of the provinces from natives, and seven years later to allow them to retain their office for life. In 1853 Russia took military possession of the provinces, but was compelled in a short time to retire, Turkey having received the assistance of France and England. In the treaty of Paris at the close of the Crimean war in 1856 it was agreed among other things, that the Principalities of Moldavia and Wallachia should continue to enjoy, under the suzerainty of the Porte and under the guarantee of the contracting powers, the privileges and immunities of which they were in possession, and that no exclusive protection should be exercised over them by any of the guaranteeing powers. The Porte engaged to preserve to the principalities an independent and national administration. In 1858 the principalities were united under one ruler, Colonel Couza, who took the title of Prince Alexander John I. In 1861 Moldavia and Wallachia were formally brought under one administration. A revolution which broke out at Bucharest in February, 1866, forced Prince Alexander to abdicate, after which the representatives of the people elected as ruler Charles, son of the late Prince Charles of Hohenzollern-Sigmaringen. In the Russo-Turkish war of 1877-78 the principality sided with Russia, but in spite of the important services which it rendered in that war it was compelled at the close of the war to retrocede the portion of Bessarabia which it acquired at the conclusion of the Crimean war, and to receive in exchange the Dobruddsha. Early in the war the principality proclaimed its independence of Turkey, and its independence was recognized in the Treaty of Berlin, July, 1878. As already stated it became a kingdom in 1881, Prince Charles becoming king as Charles I. His wife is well known as a writer under the pseudonym Carmen Sylva. His nephew and heir, Prince Ferdinand, was married in 1893 to Princess Marie, daughter of the late duke of Saxe-Coburg-Gotha.

ROUMELIA. See RUMIA.

ROUND, a short simple musical composition, written generally for three or more voices on the same clef. Each voice takes up the melody after the first has sung the first phrase or so, the third following the second, as it followed the first, and so on, until after a certain number of repetitions the signal is given to stop. It is evident that the melody must be so constructed that each phrase must harmonize

with the other, so that, when all the voices are singing, a three or four part harmony is heard.

ROUND ROBIN, a written protest or remonstrance, petition, &c., signed in a circular form by several persons, so that no name shall be obliged to head the list.

ROUND TABLE. If we may believe tradition, towards the end of the fifth century there reigned in Britain a Christian king the British Uther-Pendragon, who had a most powerful and not less wise and benevolent character, Merlin for a counsellor. Merlin advised him to assemble all his knights, who were distinguished for piety, courage, and fidelity towards him, at feasts about a round table. It was calculated to receive fifty knights, and was to be occupied for the present only by forty-nine, one place remaining empty for an occupant yet unborn. This was Arthur or Artus, son of the king by Igerna, whom the king by the magic power of Merlin was permitted to enjoy under the form of her husband, Gorlos, duke of Cornwall. Merlin had exacted a promise that the education of the prince should be intrusted to him, and he accordingly instructed him in everything becoming a brave, virtuous, and accomplished knight. Arthur, therefore, at a later period occupied the empty seat at the round table, which under him became the resort of all valiant, pious, and noble knights. (See ARTHUR.) This story afforded materials for the romantic poets of the Anglo-Normans, forming a distinct cycle of characters and adventures. (See ROMANCE.) According to another account Arthur himself established the round table at York, and only twelve knights took their places round it. The adventures of the knights of the round table are founded on the legend of the Grail (which see), and have become familiar to all through Tennyson's *Idylls of the King*.

ROUND TOWERS, tall narrow circular edifices, found in many places in Ireland, and in two or three places in Scotland. They vary in height from 50 to 120 feet, get gradually narrower towards the top, and are crowned with a conical roof. They are entered by a door 8 or 10 feet from the ground, and are divided into stories by stone or wooden floors, ladders forming the means of communication between the stories. Each story is lighted by a small window, either square or arched, and there are generally four windows near the junction of the conical top. Antiquaries have been much puzzled in determining their purpose and date. They have been held by some to be temples built by Danes, Phœnicians, Persians, Buddhists, &c., but the question has to a certain extent been set at rest by the investigations of Dr. Petrie, in his *Ecclesiastical Architecture of Ireland anterior to the Anglo-Norman Invasion* (Dublin, 1845), in which is collected a mass of evidence tending to prove that they were constructed by Christian architects, in the immediate vicinity of churches or monasteries, at various periods between the fifth and thirteenth centuries, and were designed to answer at least a twofold purpose, namely, to serve as bell-towers, and as keeps or places of strength, in which the sacred utensils, books, relics, and other valuables were deposited, and into which the ecclesiastics, to whom they belonged, could retire for security in case of a sudden predatory attack, and also that they were occasionally used when necessary as beacons and watch-towers. Dr. Daniel Wilson, however, in his *Prehistoric Annals of Scotland*, assigns a later date to the oldest of these structures, and holds that none of them are older than the ninth century. About 118 towers of this description are yet to be seen in Ireland, twenty of which are entire or nearly so, while Scotland possesses three, situated at Brechin, Abernethy, and St. Eglushay in Orkney.

ROUND WORMS See NEMATELMIA.

ROUSAY, or ROWSA, one of the (Orkney Islands, between Westray on the north and Mainland on the south. It is about 5 miles long north to south, and about $2\frac{1}{2}$ miles broad. The centre consists of high hills covered with heath, leaving a margin of fertile land round the shore. Agriculture has made considerable progress in recent years. Pop (1891), 774.

ROUSSEAU, JEAN BAPTISTE, an eminent French lyric poet, born at Paris, in 1671, was the son of a shoemaker, but received a good education, and at an early period displayed a strong taste for poetry. In 1688 he obtained a situation in the service of the French ambassador at Copenhagen, and subsequently accompanied Marshal Tallard to England as his secretary. He wrote several pieces for the theatre, but met with comparatively little success. In 1701 he was admitted into the Academy of Inscriptions and Belles Lettres, and his lyric compositions procured him high reputation among the French literati, but his turn for satire and his quarrelsome temper at length involved him in disgrace. Some abusive and indecent verses were circulated at Paris, which Rousseau was accused of having written, but which he disclaimed, professing to have discovered the author in the person of his enemy, Saurin. To relieve himself from the obloquy under which he laboured, he commenced a prosecution of that academician. Saurin succeeded in proving to the satisfaction of the court that Rousseau had suborned several of the witnesses, and the poet was exiled from France in 1712. He went to Switzerland, and afterwards resided at Vienna, under the patronage of Prince Eugène. The latter part of his life was spent in the Netherlands, where he obtained a pension from the Duke of Armburg, which he resigned on having forfeited the favour of that nobleman. His death took place at Brussels in 1741. An edition of his works was published under his own inspection, by Tomson (London, 1723, two vols 4to), and since his death they have been often printed in various forms. One of the best editions is that of Amar, with a commentary and life of the author (five vols Paris, 1820). The same editor has also published his (*Œuvres posthumes*), with a commentary (two vols 1824). Rousseau's works consist of odes, sacred and secular, on which his reputation now chiefly rests, cantatas, a species of composition of which he is the creator, epigrams, many of which are extremely witty and biting together with operas, comedies, and poetical epistles of no particular merit.

ROUSSEAU, JEAN JACQUES, one of the most celebrated writers of the 18th century whose works had a great influence on the moral and political feelings of the age, was the son of a watchmaker in Geneva, where he was born 28th June, 1712. His mother died nine months after his birth, and he was brought up under the tender care of a sister of his father's. In his *Confessions* he tells us that at the age of seven he was very devout, that at this time he was a great reader of romances, and at the age of eight knew Plutarch's *Lives* by heart. He also became acquainted with Tacitus and Grotius, which lay about in his father's shop, while quite a boy, and his musical taste was displayed at the same early age. In his tenth year he was placed with a clergyman in the country, and in his fourteenth was articulated to an engraver, whose severity disgusted him with his situation. He therefore ran away from his master, and after wandering about for some days near the city, he arrived at Confignon, where he was received into the house of the cure of the village, and for some time hospitably treated. By this clergyman he was recommended to the notice of Madame de Warens, who sent him to a charitable institution in Turin,

where he abjured Protestantism in favour of Catholicism. His conversion being accomplished (the aim of his being sent to the institution) he left Turin, but not before he had fallen in love with the pretty wife of a jeweller who had given him employment. The husband, on discovering Rousseau's passion, immediately turned him out of the house in a manner fatal to the dignity of an ardent lover. He then became a lackey in the house of the Countess de Verceilis, where, as he himself informs us in his *Confessions*, he stole a ribbon, this being found among his clothing he was accused of the theft, but he declared he had received it from a servant maid, and both were summarily dismissed. He afterwards entered the service of the Count de Gouvion, whose son had him educated, meaning to employ him as his secretary. A chance meeting with an old good-for-nothing acquaintance induced him to leave this place, and after some months of a vagabond existence he returned in a miserable plight to Madame de Warens. After much deliberation this lady determined to educate him for the church, and he was sent to the seminary of Annecy, which he left in a short time, after having convinced his teachers that he was fit for nothing—not even the priesthood, and acquiring nothing but a taste for, and some little knowledge of music. Again we find him leading an unsettled life for some months, after which he returned once more to his protectress, who now conceived the extraordinary idea of removing the youth (now in his twenty first year) from the temptations of vice by becoming his mistress herself. In the summer of 1736 they went to live at Charmettes, near Chambéry, where they appear to have lived happily for nearly three years, when Rousseau fell into a state of hypochondria, believing himself afflicted with a polypos in the heart. He resolved to go to Montpellier to place himself under medical treatment, but on his way he met a young lady whose charms completely dispersed all his morbid delusions. On his return to Charmettes, about two months afterwards, he found his place in the affections of Madame de Warens occupied by another, whereupon he set off to Lyons, becoming there tutor in the family of a M de Mably. In the autumn of 1741 he went to Paris, where, under the recommendation of Raumur, he read a paper before the Academy of Sciences on certain grand improvements he fancied he had made in musical notation. That body came to the conclusion that, though the improvements were ingenious, they were neither new nor practicable. He lived a very precarious life in the capital, without fixed abode or means of support, until he was appointed secretary to M de Montaign, the French ambassador at Venice. After a residence of a year and a half in that city of islands he quarrelled with his harsh and avaricious chief, and returned to Paris in 1742, and there earned his living by copying music, employing his leisure hours in the study of natural science. About this time he became intimate with Diderot, Grimm, D'Holbach, and Madame d'Épinay. In 1750 he gained the prize offered by the Academy of Dijon, on the question whether the revival of learning has contributed to the improvement of morals, taking the negative side of the question, it is said, at the suggestion of Diderot. He soon after brought out his *Devin du Village*, a comic opera, of which he had himself composed the music. This piece was received with general favour, and the author was almost worshipped by the French, but the appearance of his celebrated *Letter on French Music* (1753), in which he pointed out its defects, excited a general storm. Singers and connoisseurs who could not wield the pen contributed to spread calumnies, pasquinades, and caricatures against the author, who retired to Geneva. By his change of

religion he had lost the rights of a citizen. He now again embraced Protestantism, and was formally reinstated in the privileges of a free citizen of Geneva. From Geneva Rousseau went to the Hermitage, a charming retreat near Paris, provided for him by Madame d'Épinay (1756). Jealous of the esteem he was held in by this lady, his pretended friends Grimm and Diderot did all they could to bring about a misunderstanding between him and his benefactress. In this they were successful, and in 1757 he quitted the Hermitage and returned to Paris, and fixing himself at Montmorency, finished his *Contrat Social*, his *Julie, ou la Nouvelle Héloïse*, and his *Emile*. His political treatises, particularly the essays on the social contract, and the inequality of conditions, were the sources of many of the speculative errors of the French revolution. His *New Eloisa* produced a very different, but equally strong sensation in France, where love merely fluttered around the toilet, and in those countries where female virtue was looked upon with respect. His celebrated work on education, *Emile, ou de l'Éducation* (1762), was originally written for the use of a mother. It was condemned by the Parliament of Paris on account of its religious views, and he himself was sentenced to imprisonment. He wished to retire to Geneva, but he was also threatened with imprisonment there, and his book was burned by the common hangman. He therefore took refuge in Montiers Travers, a small village of the Prussian province of Neuchâtel, where he again found himself among Protestants, the simplicity of whose worship was agreeable to him. Here, too, he obtained a protector and friend in the person of Marshal Keith, the governor of the province, but the intrigues of his enemies pursued him even hither. The Geneva clergy assailed him from their pulpits, he wrote his celebrated *Letters from the Mountains* in reply to their attacks. This work, with his *Letter to the Archbishop of Paris* and his *Dictionnaire l'hygiène Portatif*, were publicly burned in Paris in 1765. New troubles drove him from Montiers, and he resided two months on Peter's Island, in the Lake of Bièvre. His residence here produced his *Botaniste sans Maître*. Neither was he long tolerated here, the authorities of Berne ordered him to quit the country without delay in the severest season of the year. On reaching Paris he became the object of ridicule to the philosophers, but was kindly received by Hume, whom he accompanied to England, but yielding to his unfounded suspicions of his friends in England he left the country, and returned to Paris in 1767. In 1768 he published his *Musical Dictionary*, and soon after appeared his melodrama of *Pygmalion*. In May, 1778, he retired to Ermenonville, near Paris, where he died of apoplexy, July 2 of the same year. The principal traits of Rousseau's character were an enthusiastic passion for love and freedom, a spirit of paradox, an inflexible obstinacy, and a warm zeal for the good of men, combined with a gloomy hypochondria. His works were published at Paris, ten vols. 1764, and have often been republished. Theresa Levasseur, a young girl of obscure origin, became his companion in 1745, in 1768 he married her. His children by her had all been placed in the foundling hospital. She was faithful to him, and knew how to gratify his humours, but had no other merit. In 1791 a *fête champêtre* was established at Montmorency in honour of Rousseau, and his bones were deposited in 1794 in the French Pantheon. See Saint Marc Girardin's *J. J. Rousseau, Sa Vie et Ses Ouvrages* (1875), his own *Confessions*, and John Morley's *Rousseau* (1873).

ROUSSETTE, a name sometimes applied to the Pteropidae (See KALONG BAT) or Fox Bats of the Eastern Hemisphere, which represent the only group

of Frugivorous or Fruit eating Chiroptera. The head in these forms is of fox like conformation, the jaws being more prolonged than in other groups of bats. The incisor teeth are small, number four in each jaw, and mostly fall out as the animals grow old. Canines of small size are also developed. The molar teeth are tuberculate and blunted on their crowns, although by much use the tubercles may disappear, and leave the teeth as if flat crowned. The ears are moderate in size, and are never provided with the leafy or foliaceous appendages seen in many other bats. The nose also, is never furnished with these appendages. The eyes are large. The tail is short, and the patagium or wing membrane does not fully unite the short tail and hind limbs in the form of an inter femoral membrane. The first finger is of short conformation, and is provided with a claw like nail. The Eastern Archipelago forms the special centre of distribution of the Roussettes, but the group is also represented in Africa, Australia, and on the Asiatic continent. The food consists of fruits, but these animals may also eat small birds, insects, &c. They are all of harmless nature, spending the day amid the foliage of trees, from the branches of which they suspend themselves, head downwards, by means of their feet. The flight is powerful, strong, and steady.

Various species of these animals are known. The Kalong Bat of Java or Fiddle Roussette (*Pteropus edulis*), described in the article KALONG BAT is the most familiar form. Other species are the Red-necked Roussette (*P. rubicollis*), Edwards Roussette (*P. edwardsi*), the Common Roussette (*P. vulgaris*), &c.

ROUSSILLON, before the revolution a French province, bounded north by Languedoc, east by the Mediterranean, south by Catalonia, and west by the Pyrénées, about 18 leagues in length and 12 in breadth. It now forms the department of the Pyrénées Orientales. The ancient capital was Russumo, which stood in the neighbourhood of Perpignan. The Counts of Roussillon governed this district for a long time. The last count bequeathed it to Alphonso of Arragon in 1178. In 1462 it was placed in the hands of Louis XI of France, in pledge for the repayment of a loan, but in 1493 it was restored by the Treaty of Narbonne to the kings of Arragon without the exaction of the sum that the King of France had formerly advanced. In 1659 it was finally annexed to France by the Treaty of the Pyrénées.

ROUSSILLON WINES, in general the wines of the province of this name. The best for export are those of Baix, Tormilla, Salces, Lluçsaltes, Spira, Collioure, Bagnols, Parcous, and St André. The red sorts are thick, of a beautiful colour, and used chiefly to improve other wines. A particular sort is called Grenache, and is, at first, similar to the Alicante wine, dark red, but grows paler with age, and in the sixth or seventh year is similar to the famous Cape wine. Of the white Roussillon wines the Macabeo is the most costly.

ROVE-BEETLES, or COCKTAILS, the name applied to a tribe of Beetles or Coleoptera belonging to the division Brachelytra or Staphylinida, characterized by the short elytra or wing covers, which are only about one fourth of the length of the abdomen. The common species is the *Ocypus* or *Gorrius olens*, or 'Devil's Coach horse,' a fanciful name given to it from its somewhat diabolical or demon like aspect when it curls up the abdomen and opens its jaws. The *Crochylus maculatus* is another familiar species. These beetles are carnivorous in habits, and are apt to bite if incautiously handled. The habit of cocking the tail has been alleged to have for its object the function of pushing the hinder wings under the short

elytra, which are formed by the front wings and which protect the hinder or functional wings. These beetles fly about chiefly in the dusk and at night. The tarsi generally possess five joints. In the species known as *Staphylinus erythropterus* the elytra are coloured dusky red, and this insect forms a chief part of the food of the Red backed Shrike. In *Creophilus marillosus* the elytra are of a gray colour, and are hairy (See PL LXV—LXVI fig 40)

ROVEREDO, or ROVEREITH, a town of Austria, in Tyrol, 84 miles north of Verona, beautifully situated on both sides of the Leno, and the left bank of the Etsch or Adige, here crossed by a handsome stone bridge. It is well built, many of the houses being constructed of marble. It contains a remarkable old castle called Junk, situated on a height in the public square, surrounded with walls, and originally the residence of the Venetian governor, an English female institute, Capuchin monastery, theatre, hospital, in firmery, and poor house. It is one of the principal seats for the manufacture of silk. The other manufactures are leather and paper, and there are several dye-works. Roveredo is also famous for its fruits. Pop (1890), 9030

ROVIGNO, or TRIVIGNO, a town and seaport of Austria, in Illyria, 40 miles south of Trieste, on a rocky eminence, on a tongue of land which projects into the Adriatic, and by its sides forms two excellent havens. It contains a cathedral, which is built on the model of St Marks at Venice, a normal high school and two hospitals, a German zoological station, and has manufactures of tobacco, cement, glass, pastry, spirits, and other commodities, besides some ship building. The port possesses a considerable number of trading vessels, besides a great number of smaller craft, chiefly employed in the sardine and tunny fishing, which employs many hands. The trade is principally in wood, olive oil, and wine. Pop (1890), 9528

ROVIGO, a town in Italy, in the compartimento of Venice, 23 miles south by west of Padua, capital of a province of its name, on both sides of the Adigetto, an arm of the Adige. It consists of an upper town, San Giustino, and a lower, San Stefano, which are separated by the river, and communicate by four bridges, and is both surrounded by walls flanked with towers, and defended on its west side by a castle. The fortifications, however, are very much dilapidated, and the prosperity of the place is much impeded by the unhealthiness of its site. It is the usual residence of the Bishop of Adria. The public edifices include a cathedral, a governor's palace, seminary, academy of arts and sciences, &c. The principal manufactures are leather and saltpetre. The trade is unimportant, but there is a famous annual fair, which lasts eight days. Pop 12,000

ROVUMA, a river of East Africa, falling into the Indian Ocean in lat 10° 30' S., lon 40° 27' E. It rises east of Lake Nyassa, and has a course nearly due east of about 500 miles. It is the boundary between the East African territories of Germany and Portugal. At its mouth it forms a magnificent bay, and has no bar. The current is rapid, but the volume of water is not great, and the river is at times only navigable by a small vessel. Upon the left or north side of the river, 25 miles from the entrance, is a small lake, which is connected with it in flood time. The navigation becomes more difficult as the river is ascended, the channel being much impeded in the dry season by 'snags' brought down by the floods. In some places the river is divided into two or three shallow channels. The valley of the Rovuma is from 2 to 4 miles broad, and its direction is tolerably straight, the channel in the dry season, however, is exceedingly tortuous, and useless for

navigation for at least four months in the year. The Rovuma is remarkable for the high lands that flank it for 80 miles from the ocean. The cataracts of other rivers occur in mountains, those of the Rovuma are found in a level part with hills only in the distance, about 160 miles from the sea. Crocodiles inhabit the stream, and are much hunted by the natives, by whom their flesh is eaten and relished.

ROWAN TREE, ROAN-TREE, or MOUNTAIN ASH (*Pyrus aucuparia*), a native of Europe and Siberia, is met with in abundance throughout Britain, particularly in the Highlands. Its leaves are pinnate, leaflets uniform, serrated, glabrous. It has numerous white flowers in corymbs, with a light almond-like scent. The fruit consists of small globose berries, of a red colour, very juicy, and bitter to the taste, they are eaten in some parts of Scotland and Wales, and afford an agreeable fermented liquor, and by distillation a strong spirit. An agreeably flavoured jelly is also made of the rowan berries. The tree attains a height of from 20 to 40 feet, and affords valuable timber, much used by wheelwrights and others. The bark is used by tanners and the berries yield a dye. In the days of superstition the rowan tree was regarded as an object of peculiar veneration, and a mere twig of it was supposed to be efficacious in warding off evil spirits, and in preventing the evil designs of witches. In Scotland it is commonly planted near dwellings.

ROWE, NICHOLAS, an English dramatic poet, born in 1674, at Little Barford, Bedfordshire, was the son of John Rowe, a sergeant at law. He studied at Westminster, as king's scholar, under the celebrated Dr Busby, and at the age of sixteen was entered a student at the Middle Temple, but on the death of his father, when he was put in possession of a competency, he gave up the law, and turned his chief attention to polite literature. At the age of twenty-four he produced his tragedy of the Ambitious Step-mother, Tamerlane followed, which was intended as a compliment to King William, who was figured under the conquering Tartar, whilst Louis XIV, with almost equal want of verisimilitude, ranked as the Turkish Bajazet. It was, however, a successful piece, and indeed, with little nature, contains many elevated and manly sentiments. His next dramatic performance was the Fair Penitent, remodelled from the Fatal Dowry of Massinger. In 1704 he wrote the Biter, a comedy, which being altogether a failure he was prudent enough to keep to his own line, and from that time to 1715 produced his Ulysses, Royal Convert, Jane Short, and Lady Jane Grey. When the Duke of Queensberry was made secretary of state he appointed Rowe his under secretary. This post he lost by the death of his patron, but on the accession of George I he was made poet-laureate, and also obtained several posts, the emoluments of which, aided by his paternal fortune, enabled him to live respectably. He died in 1718, in his forty fifth year, and was buried in Westminster Abbey, where his widow erected a monument to his memory. The dramatic fables of Rowe are generally interesting, and the situations striking. His style is singularly sweet and poetical, his pieces forcibly arrest attention, although they but slightly affect the heart. As an original poet Rowe appears to advantage in a few tender and pathetic ballads, but as a translator he assumes a higher character, as in his version of Lucan's Pharsalia, published after his death, which, although too diffuse, was highly praised by Johnson. The poetical works of Rowe were published collectively in three vols 12mo, 1719.

ROWING is the art of propelling a boat by means of oars, and consists of two actions, the stroke and the feather. In making the stroke the oarsman, who sits with his face towards the stern of the boat, well

forward on the edge of the seat, the oar firmly grasped in his hands and stretched out in front of him to the full extent of his arms, dips the blade of the oar into the water at right angles to it, until it is just submerged and no more. The weight of the body is then thrown backward, and the arms are drawn forcibly towards the body, the legs being meanwhile kept pressed against the stretchers, the elbows are allowed to pass the sides, and the handle of the oar is brought close up to the chest, which completes the stroke. By this means the boat receives a forward motion, for though the water is *apparently* displaced by the oar, the fact is that the water is the fulcrum on which the oar as a lever acts, and the displacement of water is inappreciable. Feathering the oar is the act of taking it back into a position in which to repeat the stroke. This is done by raising the oar out of the water, allowing the wrists to drop so as to make the blade parallel with the surface of the water, and pushing forward the handle of the oar, when the blade is again brought at right angles to the water preparatory to repeating the stroke.

The best way of acquiring a knowledge of the art is by closely observing the actions of a good oarsman, but a few hints may be given here with regard to the posture, &c., to be observed in rowing. The oarsman should first adjust the stretcher so as to suit the length of his legs, taking care that it is just short enough to allow the oar to pass conveniently over the knees. He next settles himself firmly on the thwart, directly opposite the handle of the oar sitting square and upright and as near the edge as consistent with this position. His feet should be firmly pressed against the stretchers, the heels kept close together and the toes widely apart, so as to keep the knees separate, the shoulders should be thrown back, the chest kept well out and the elbows close to the sides. The oar should be held firmly, but not too tight, the outside hand grasping it close to the extremity of the handle, the fingers above and the thumb underneath, and the inside one held in a similar manner, but more convexly, about 2 inches from the other. In taking the stroke the body should be inclined forward, the chest as elevated as possible, the backbone straight, and the arms perfectly straight from the shoulders to the wrists. When the arms are at their limit the oar should be brought down firmly and decisively into the water, and the weight of the body thrown entirely upon it. The stroke should be finished with the arms and shoulders, the elbows being kept close to the sides and the shoulders down and back and head erect, and care should be taken not to diminish the force of the stroke towards its completion. When the oar has reached the breast bone the hands should be dropped down, and then turned over and shot out again close along the legs, the body following at once. To effect a quick recovery the back must be kept straight, and the knees must not be dropped too low.

Rowing is one of the most healthful exercises that can be engaged in, but it is only at a comparatively recent date that it has taken a prominent place among outdoor recreations. Boat racing was not much in vogue before the latter half of the eighteenth century, but since that time it has been largely practised and peculiar facilities are now afforded for its exercise through the improved construction of race boats. The introduction of sliding seats, an American invention, introduced into England in 1871, has added greatly to the power of the rower by lengthening the stroke. The sliding seat is a small piece of board on which the oarsman sits, and which works on rollers and slides backwards and forwards as the oarsman makes his stroke. The boat race which in Great Britain attracts most interest is that between the

Universities of Oxford and Cambridge. It is rowed with eight oared boats on the Thames, between Putney and Mortlake. The first race was in 1829, and the race has been annual since 1856. Down to 1902 there have been fifty nine contests, of which Oxford has won thirty three, Cambridge twenty five, that of 1877 resulting in a dead heat.

ROXBURGHE, ROXBOROUGHSHIRE, or TEVIOTDALE, an inland county of Scotland bounded south west by the county of Dumfriesshire, south east and east by Cumberland and Northumberland north by Berwick, west by Midlothian and Selkirk. Area, 428 527 acres, of which about half is mountain and heath. There is great variety of surface but its general character is undulating. The Cheviot Hills extend from the eastern extremity of the county south west along the border of Northumberland. The highest land occurs at Carter Fell and other points in the ridge of the Cheviots, on the east, and the Maiden Paps, Windburgh Hill, &c. between the sources of the Teviot and the Liddel, on the south. The hills are mostly smooth, dry, and green affording excellent pasture. The eastern side of the county is chiefly occupied by the formations of the new red sandstone group, the western side by graywacke rocks, the Cheviot or border hills are chiefly of trap formation, and Liddesdale is occupied by the Coal measures, where also as in some other parts of the county, limestone is abundant. The chief rivers are the Tweed and Teviot, the latter a tributary of the former, flowing through a great part of the county. A considerable portion of the soil is fertile, and where it is so arable husbandry is well understood and practised but by far the greater part of the county is occupied as sheep walks. Farms are generally large and some farmers hold three or more at once. About one tenth of the surface is under corn crops, chiefly oats, about 21,000 acres are under green crop chiefly turnips, and nearly 60,000 acres are in permanent pasture. Woods and plantations cover about 16,000 acres. Various branches of woollen manufacture are prosecuted with great vigour and success in some of the principal towns in the county, particularly Hawick and Jedburgh. The county returns one member to Parliament. The county town is Jedburgh, the only royal burgh, but Hawick is a much larger town, and Kelso is also larger. Hawick is the returning burgh of the 'Border burghs' district comprising the towns of Hawick, Selkirk, and Galashiels. Pop. (1881), 53,442, (1891), 53,726, (1901) 48,793.

ROXBURGHE CLUB, a society called after John, the third duke of Roxburghe who was celebrated as a bibliomaniac. His library of over 9000 works, which was particularly rich in old romances of chivalry and early English poetry, was sold by public auction in London in 1812. The prices paid for some works were enormous. A copy of the first edition of Boccaccio (*Venice*, in 1471, folio) was bought by the Marquis of Blandford (Duke of Marlborough) for £2260 sterling, a copy of the first work printed by Caxton with a date, *Recuyell of the Historyes of Troye* (1471, folio), was sold for 1000 guineas, and a copy of the first edition of Shakspeare (1623, folio) for 100 guineas. The Roxburghe Club was formed in commemoration of this triumph of bibliomania. Its objects are to print a limited number of impressions of manuscripts and rare works for the use of the members only. Originally the club consisted of thirty one members, now the membership is forty. The Roxburghe Club was the first of a number of societies founded with similar aims, being succeeded by the Bannatyne Club, the Maitland Club, and others. Every year one of the members is at the expense of an impression of some rare book.

ROY, WILLIAM, a British general, celebrated as a geodesist and antiquary, was born May 4, 1726, at Milton Head, in the parish of Carlisle, Lanarkshire, and was educated at the parish school and at Lanark grammar school. In 1746 he was appointed assistant to Lieutenant Colonel Watson, who was employed by the government to make a survey and map of Scotland for military purposes, but of this work only a reduced copy was ever published. He served also under Watson in England, took part in Mordaunt's expedition against Rochefort in 1757, and was present at the battle of Minden in 1759 as captain of engineers. He afterwards acted as deputy quarter master general in Germany and in England, and in 1762 was made lieutenant colonel, subsequently becoming colonel and major general. In 1767 he was chosen a fellow of the Royal Society. Perhaps his greatest achievement was the successful measurement of the base line of 27,404½ feet on Hounslow Heath (See **ORDNANCE SURVEY**). So accurate was this measurement that when measured again at a subsequent date a difference of 2½ inches was all that existed between the two results. For this important work, the first step in the great ordnance survey of the United Kingdom General Roy received the Copley medal of the Royal Society. He afterwards directed the observations and measurements for connecting the English triangulation with the French a task which he completed in 1788. He passed the winter of 1789-90 in Lisbon, for the benefit of his health and returned in the spring to London where he died July 1, 1790. His *Military Antiquities of the Romans in Britain* was published by the Society of Antiquaries after his death (1793).

ROYAL ACADEMY See **ACADEMY**

ROYAL ACADEMY OF MUSIC an institution established in 1823 in London mainly through the exertions of Lord Broughersh (afterwards Earl of Westmorland), and incorporated by royal charter in 1830. The purpose for which it was founded was to afford a first class musical education in the various branches of music and to properly equip those who make music a profession. It receives a grant from the government and from this and other sources is able to award to successful competitors a large number of scholarships and prizes. Instruction is given in musical composition, singing and instrumental playing. Concerts are given at intervals by the pupils. Connected with the R.A.M. are associates, fellows, and licentiates, besides honorary members. Among principals have been Sir George Macfarren and Sir A. C. Mackenzie.

ROYAL COLLEGE OF MUSIC See **SUPP.**

ROYAL COLLEGE OF SCIENCE See **SCIENCE AND ART**

ROYAL FAMILY in its widest sense as referring to Great Britain embraces all the British descendants of the royal house; in its narrower sense it includes only the queen consort and queen dowager, with all the lineal descendants of the sovereign. The husband of a queen regnant is Prince Albert was to Queen Victoria is not as such a member of the royal family. In the case, however, of Prince Albert the style of royal highness and a precedence next to the queen were conferred upon him by statute. The members of the royal family have precedence before all peers and officers of state. Payment was made annually out of the consolidated fund to Queen Victoria of £385,000, of which £60,000 went to the privy purse. The civil list of Edward VII is fixed at £170,000, and in addition £20,000 (besides the revenues of the Duchy of Cornwall) is paid annually to the Prince of Wales, £10,000 to the Princess of Wales and £18,000 to the king's daughters. The other members of the

royal family are paid annually out of the consolidated fund as follows.—Duke of Connaught, £25,000, Princess Christian of Schleswig Holstein, Princess Louise (Duchess of Argyll), Princess Beatrice (Henry of Battenberg) Duchess of Albany, £6000 each, the Duke of Cambridge, £12,000, and the Grand Duchess of Mecklenburg Strelitz (daughter of the Duchess of Cambridge), £3000. See **QUEEN** and **PRINCE OF WALES**.

ROYAL HOUSEHOLD, a collective name for those persons who hold posts in connection with the household of the British sovereign. Among personal attendants are the keeper of the privy purse, His Majesty's private secretary and assistant, resident medical attendant &c. The Lord Steward is the head of a department comprising a treasurer, comptroller master of the household, secretary to board of green cloth &c. The Lord Chamberlain's department includes besides the lord chamberlain himself, a vice chamberlain, comptroller of accounts, examiner of plays, paymaster of household, lords in waiting, groom in waiting, master of the ceremonies, marshal of the ceremonies, gentlemen ushers of the privy chamber, librarian at Windsor, poet laureate, painter in ordinary, surveyor of pictures, governor of Windsor Castle, keeper of the Tower jewels, master of the music, pages, sergeants at arms, yeomen of the guard, gentlemen at arms, the military knights of Windsor, &c. To the Medical Department belong physicians in ordinary and extraordinary, a surgeon and surgeons extraordinary, a physician and a surgeon to the household &c. The Department of the Master of the Horse includes besides its chief, a crown equerry, equeries, pages of honour, &c. The Mistress of the Robes presides over a department comprising ladies of the bedchamber, bedchamber women, maids of honour &c. The royal household also includes the dean and the sub-dean of the chapels royal, chaplains, the hereditary grand almoner, the lord high almoner, the master of the buckhounds and others.

ROYAL INSTITUTION OF GREAT BRITAIN an institution founded in 1799 by Count Rumford Sir Joseph Banks and other men of science and incorporated in 1800. It was reconstituted on a wider basis in 1810, and has for objects the promotion of scientific and literary research, the teaching of the principles of experimental science, the exhibition of the applications of these principles to the arts and the affording of opportunities for study. Many distinguished chemists and physicists have conducted their researches in the laboratories of the institution among them being Davy, Faraday, Tyndall, Frankland, Gladstone, Dewar, Rayleigh. The library contains some 60,000 volumes. There are professorships of natural philosophy, chemistry, and physiology.

ROYAL MARRIAGE ACT In consequence of the marriage of the Duke of Gloucester, brother of George III. with the Countess dowager of Waldegrave and of the Duke of Cumberland with the daughter of Lord Ingham, the act 12 Geo. III. cap. xi. was passed in 1772. In terms of this act no descendant of the body of George II., other than the issue of princesses married into foreign families, shall be capable of contracting marriage without the previous consent of the sovereign signified under the great seal, and any marriage contracted without such consent is declared void. But such descendants, if above the age of twenty-five, may, after twelve months' notice given to the privy council, contract and solemnize marriage without consent of the crown, unless both houses of Parliament shall, before the expiration of the year expressly declare their disapproval of such intended marriage. A marriage other-

wise entered into will be void, the minister, and all persons present at its celebration, incurring the penalties of *perjury*.

ROYAL NAVAL VOLUNTEERS, a reserve volunteer force of seamen for service in time of emergency. This force was called into existence by act 22 and 23 Vict. cap xl, which gives power to the Admiralty to keep up a number of men not exceeding 30,000 to be called 'the Royal Naval Volunteers,' such men to be raised in the United Kingdom and Channel Islands by volunteer entry from among seafaring men and others deemed suitable to the service. Volunteers to be entered for five years, subject to the provisions of the act. At the end of the fifth year they may claim to be discharged, but are not to be actually discharged without the consent of the admiralty. Volunteers may be trained and exercised for twenty eight days in each year, either on shore or on board ship, and may be required to join any ship the admiralty think fit. The whole or part of the force may be called into actual service by proclamation, or notice to Parliament if sitting, and when called out they are to be victualled in the same manner as seamen of the fleet. They are liable to serve three years in the navy on the same terms as the crews of the vessels to which they are appointed, or that term may be extended by proclamation to five years, when they are allowed 2d a day extra for the additional two years. A penalty of £20 is incurred for failing to attend training and exercise. The admiralty has the power of granting pensions to the volunteers who have served.

ROYAL SOCIETY (EDINBURGH) This association was founded mainly through the exertions of Principal Robertson, the historian, who wished to reproduce in the Scottish metropolis an institution of the Berlin Academy type, for the purpose of investigating and discussing all subjects connected with science, erudition, and taste. It was instituted and chartered in 1783, and held its meetings in the College Library till 1810, when the members removed to a house in George Street, purchased by themselves. In 1826 they took a lease from government of apartments in the Royal Institution, on the Mound, off Princes Street. The president's chair has been occupied by some of the most renowned men of their day, among others by Sir Walter Scott, Sir David Brewster and Lord Kelvin. The society meetings are held on the first and third Mondays of every month from December to May, at eight p.m. Each candidate for ordinary fellowship must pay an admission fee of five guineas, besides contributing to the funds an annual sum of three guineas. After fifteen years membership this sum is reduced to two guineas, members of twenty five years' standing pay no annual subscription. In addition to funds drawn from this source the society receive an annual grant of £300 from Parliament. The papers read before the society are published in its *Transactions*, a quarto serial, of which about forty volumes have been issued. Abstracts of the papers also appear in the *Proceedings*, of which some twenty octavo volumes have now appeared. Alexander Keith, of Dunottar, founded a biennial prize, amounting at present to upwards of £60, to be awarded to the author of the best paper on a scientific subject read for the first time before this society in each successive biennial period. Other two valuable prizes, founded by Thomas Makdougall Brisbane and Patrick Neill, are also given periodically for communications on scientific and other subjects.

ROYAL SOCIETY (LONDON) This association owes its origin to a club of learned men, who, in the year 1645, held weekly meetings usually in the house of one of their members in London, for the

purpose of communicating to each other the results of their researches in chemistry, medicine, geometry, astronomy, mechanics, magnetism, and experimental philosophy in general. Among the original members of the society who met for this purpose were Drs. Wilkins, Wallis, Goddard, Ent, and Glisson, and Messrs. Forster (professor of astronomy at Gresham College), Haak, a learned German from the Palatinate, and others. Dr. Goddard's lodgings was generally their meeting place, but they occasionally assembled in Gresham College or in its neighbourhood. We learn from Dr. Wallis that the subjects which took up their early attention were, 'the circulation of the blood, the valves in the veins, the venæ lactæ, the lymphatic vessels, the Copernican hypothesis, the nature of comets and new stars, the satellites of Jupiter, the oval shape of Saturn, the spots in the sun, and its turning on its own axis, the inequalities and selenography of the moon, the several phases of Venus and Mercury, the improvement of telescopes and grinding of glasses for that purpose, the weight of air, the possibility or impossibility of vacuities, and nature's abhorrence thereof, the Torricellian experiment in quicksilver, the descent of heavy bodies, and the degrees of acceleration therein, and divers other things of like nature.' Before the close of the half century Drs. Wallis, Wilkins, and Goddard having received appointments at Oxford, went to reside in that city, where, being joined by Dr. (afterwards Bishop) Sethward, the Hon. Robert Boyle, Dr. (afterwards Sir) W. Petty and others, they formed a club like what they had left in London, and whenever any of them had occasion to be in the metropolis they attended the meetings of their former associates. About 1658 all the members with the exception of Boyle had left Oxford, and the most of them settling in London, they rejoined the friends who had remained there. The club was also strengthened at this time by the accession of several new members. Lectures were given at Gresham College, and occasional meetings held until the death of Cromwell, when they were compelled to disperse, their place of meeting being occupied as quarters for soldiers. Upon the Restoration in 1660 the meetings were resumed, and two years later the society was constituted by Charles II. a body politic and corporate, by the appellation of the 'President, Council, and Fellows of the Royal Society of London for Improving Natural Knowledge' (22d April, 1662). Between 1661 and 1664 the king frequently attended the meetings of the society to witness the exhibitions of various experiments, in 1663 he presented them with a silver mace, and granted them other two charters, conferring additional powers and privileges, in 1664 he inscribed his name as founder in the charter book, and at the same time the Duke of York (afterwards James II.) and Prince Rupert signed themselves fellows. On the 6th March, 1664, appeared the first public record of their proceedings under the title of the *Philosophical Transactions*. It contained sixteen quarto pages, with an introduction by the secretary of the society, who was considered as the editor. The intention was to publish one number on the first Monday of every month, but after the issue of the fifth number (June, 1665) the meetings were discontinued on account of the plague. The council met again in Gresham College, in February, 1666, and the public meetings of the society were resumed in June. In the same year the great fire having compelled the authorities to take possession of the rooms hitherto occupied by the society, the latter removed to Arundel House, where it was presented with a valuable library by Henry Howard, grandson of its pur-

chaser, the Earl of Arundel. In October, 1674, the fellows returned to Gresham College, where they remained till 1710, when they moved to a house purchased by themselves in Crane Court. On the 28th April, 1686, Newton presented to the society the MS of his *Principia*, which the council ordered to be printed. This was done under the superintendence and at the expense of Halley, then clerk to the society. By the death of Dr Wilkins, bishop of Chester, one of the original members, the society obtained a legacy of £400, with which was purchased an annual income of £24 from fee farm rents in Sussex, and in 1682 the college and lands of Chelsea, which had been granted them, were sold to the king for £1300, which was subsequently invested in African and East India stock. From this time the society began to have a permanent revenue. In 1703 Sir Isaac Newton was elected president of the society, a post which he held to his death in 1727. His experiments on telescopes and on light and colours were among the first subjects which gave a scientific value to the *Philosophical Transactions*. In 1706 Lady Sadleir left a sum of money for the purpose of founding a lecture for the advancement of natural knowledge, to be read before the society, but it was not until 1738 that the first lecture was delivered by Dr Stuart. In 1709 Sir Godfrey Copley bequeathed to the society at his death a sum of £100, the interest of which, or £5, was to be given annually to the person who, in the course of the preceding year had written the best paper on any subject connected with experimental philosophy. The donation has now taken the form of a gold medal, and is awarded to foreigners and Englishmen indifferently, in order to encourage an honourable competition among the savants of all countries. The first Copley medal was awarded to Stephen Gray in 1731. In 1780 quarters were assigned to the society by order of George III, in Somerset House, where they continued to meet until 1857, when, at the request of government, they removed to Burlington House, a wing of which they now occupy. In 1796 Count Rumford presented them with £1000 in the three per cent stock, the interest of which for two years (£60), was to form a biennial prize for the most important discovery or the most useful improvement during the two preceding years on light and heat. The first who received this prize was Count Rumford himself in 1800. In 1825 George IV made the society a yearly grant of 100 guineas to institute two prize medals, which are to be presented to the persons who, during the past year, shall have made the most important discovery in science and art. The first recipients of these medals were John Dalton and James Ivory, in 1826.

According to the constitution of the society, the number of resident fellows is not limited, but the numbers of foreign members must not exceed fifty. Every candidate for admission must be recommended by a certificate signed by at least six fellows, not less than three of whom must certify that the recommendation is from personal knowledge, and the name, qualifications, &c., of the candidate must be entered in a register kept for that purpose. At the first ordinary meeting in March of each year a list of the names of all candidates proposed subsequently to the 1st March of the preceding year, is hung up in the meeting room till the election day, and each fellow is furnished with a printed list. From this list fifteen names are selected by the council by ballot, and recommended to the fellows for election. The election takes place in the first Thursday in June, and the person elected must appear for admission on or before the fourth ordinary meeting after

election, but before his appearance he must pay a sum of £10 as admission fee, ordinary fellows contribute £8 yearly, or pay a life composition of £60. These payments entitle the fellows to a copy of all the periodical publications issued after election, and to the use of the library of 50,000 volumes. From their funded and landed property the society's income does not exceed £5000. They carry out as one of their duties, however, the administration of the £4000 (originally £1000) now annually voted by Parliament for scientific purposes. The session commences on the third Thursday in November, and ends on the third Thursday of June, during which period weekly meetings are held at 4.30 P.M. for the reading and discussion of papers. At the anniversary meetings held on the 30th of November the council is selected to carry on their work in the ensuing year. This council consists of a president, a treasurer, and secretaries, and numbers twenty one persons. Besides the *Philosophical Transactions* (originally intended to be published once a month, but now only once a year, and which have reached over 180 volumes), the society publishes an octavo serial entitled *Proceedings*, in which an account of the ordinary meetings is given. This was commenced in 1800, and now extends to some fifty volumes. Another valuable publication is the *Catalogue of Scientific Papers*, containing the titles of scientific papers published at home and abroad from 1800, and which is now complete, up to the end of 1883. All the above publications are for sale to the general public. On scientific subjects the Royal Society has for many years been consulted by the British government, and has given suggestions and advice which have borne valuable fruit from the voyage of Captain Cook in the *Endeavour*, in 1768, down to that of the *Challenger*, undertaken more than a century later.

ROYER-COLLARD, PIERRE-PAUL, a French statesman and philosopher, was born 21st June, 1763, at Sompnis (Marne). His infancy was spent in his father's house, under the severe surveillance of his mother, who sprang from a family ardently devoted to Jansenism. He was first sent to the college of Chaumont, and afterwards to that of St Omer, which was then under the superintendence of his uncle, the Abbé Collard. Having passed as advocate while comparatively young, he pleaded several cases before the old Parliament of Paris, but from the first days of the revolution he found himself drawn into the political vortex of the period, having been elected one of the representatives of the commune of Paris by the quarter of the Ile Saint Louis. From 1790 to 1792 he acted as joint secretary to the municipality, an office which brought him into contact with Pétion and Danton. On the insurrection of the Mountain party against the Girondists, 31st May, 1793, he retired to Sompnis, living during the Reign of Terror a studious and obscure life, and sometimes even following the plough himself to avert the suspicions of the Jacobins. In 1797 he was sent to the Council of the Five Hundred as the representative of the department of Marne. He took an active part in the labours of that assembly. He was one of these honest men who, preferring monarchy, but dreading a violent counter revolution, consented to try the republic with a moderate government. The *coup d'état* of the 18th Fructidor (4th September, 1797) completely opened his eyes, and dispelled all his illusions. It was then that he began to think of a Bourbon restoration as being the only chance for a rational government, and he opened up a correspondence with Louis XVIII, which was, however, closed about the epoch of the establishment of the empire. He remained for several years a stranger

to political activity, but soon entered on another career. He was offered the chair of philosophy in the University of France by Napoleon, in 1809, and after considerable hesitation at last accepted it. Being doubtful of his qualifications for the office, he applied himself to a course of hard study, and soon fitted himself to fulfil his task. He had adopted the principles of the Scotch philosophy of Reid and Stewart, and by his eloquent lectures formed a numerous band of disciples, and became the recognized head of the 'doctrinaire' school, of which Jouffroy and Cousin were afterwards the chief representatives. At the restoration of 1814 he gave up his professorship, and was appointed by his grateful sovereign councillor of state and chevalier of the Legion of Honour. He quitted his public offices on the return of Napoleon, and at the second restoration was again made councillor of state and president of the Commission of Public Instruction. In 1815 he was elected to the Chamber of Deputies by the department of Marne, and while still remaining steadfastly attached to the king, he showed himself the enlightened and firm friend of freedom, opposing all attempts to restore royal privileges and to infringe upon the charter. In 1827 he was admitted to the French Academy, and in 1828 he became president of the chamber. In that capacity he had to present to Charles X the address of the 221 deputies refusing their support to the government, which the king refused to read. Next day the chamber was prorogued. In 1842 he withdrew from parliamentary life, and lived in great retirement till his death at Châteauneuf (Loir et Cher), on the 4th September, 1845. Although possessed of a considerable fortune, Royer Collard lived a life of great simplicity. In his salon were to be seen Cousin, Guizot, Villmain, Casimir Perier, the Duke de Broglie, De Barante, Ampère, De Remusat, Andral, De Barthelemy, Gabriel, and many others. The subjects discussed were almost always the political events, and the debates in parliament, the acts of the government were not spared. Excepting his political speeches published in the *Moniteur*, Royer Collard left few works known to the public. See the biographies by Barante (new edition 1878), Philippe (1857), Vingtani (1858), and Spuller (1895), and Jouffroy's translation of Reid.

ROYLE, JOHN FORBES, botanist, born at Cawnpore in 1799, was educated in Edinburgh high school, obtained his surgical diploma and went to India as assistant surgeon in the service of the East India Company. He was for many years stationed in the Himalayas, where he had ample opportunities for studying the natural productions of that region. He was afterwards appointed superintendent of the East India Company's botanic garden at Saharanpur, and in 1839, after his return to England, he published his *Illustrations of the Botany and other Branches of Natural History of the Himalayan Mountains, and of the Flora of Cashmere*. This splendid work procured for him a European reputation. In 1837 he gave to the world an essay *On the Antiquity of Hindu Medicine*, and in the same year he was appointed professor of materia medica in King's College, London. In this capacity he produced his *Manual of Materia Medica*, much used as a text book. A valuable work, *On the Productive Resources of India*, was published by him in 1840, and another in 1855, *On the Fibrous Plants of India*. He died near London on January 2, 1858.

ROYTON, a town of Eng and in Lancashire, 2 miles north of Oldham, with a town hall, a market, and cotton factories. Pop (1891), 13,395, (1901), 14,881.

RSHEV, a town of European Russia, in the government of Tver, on both sides of the Volga, about 150 miles west north west of Moscow. It is a river port with a brisk trade, and there are hemp and rope manufactories. Pop (1894), 30,584.

RUABON, or RHUWABON, a town of Wales, in Denbighshire, $4\frac{1}{2}$ miles south south west of Wrexham on a small tributary of the river Dee. It has an ancient Gothic church. Coal mining is extensively carried on in the vicinity, and there are iron-works and works for the manufacture of bricks and terra cotta. Pop (1891), 17,609 (1901), 21,721.

RUATAN, or ROYATAN, an island of Central America, in the Bay of Honduras 35 miles from the coast, greatest length from N. N. E. to S. S. W., about 30 miles, breadth, about 10 miles. Its coast is rendered dangerous by reefs, but it has some good roadsteads on the south, and another on the east called Port royal, which, though difficult of access on account of the narrowness of its entrance, is capacious, and has ample depth of water within. The soil is fertile and vegetation is very luxuriant. The cocoa palm is abundant and figs and vines are found growing spontaneously. The population is variously estimated from 2000 to 4000. Ruatan and its dependencies, Bonuca, Utila, Barbareta, &c., which comprised the colony of the Bay Islands, formerly belonged to Britain, but in 1866 they were given up to the government of Honduras.

RUBBLE, that class of masonry in which unhewn stones, irregular in size and shape, are employed. In coursed rubble work the stones are roughly dressed and laid in horizontal courses, in uncoursed rubble the stones are built up together, large and small being fitted to each others forms with more or less exactness.

RUBEFACIENTS, substances or agents which, when applied for some time to the skin, occasion a redness and increase of heat. When the irritant effect of any agent amounts to blistering, or causes discharge of pus or matter, the action is said to be vesicant or suppurative. All these agencies are included under the one term counter irritants, the rubefacient action being the mildest of the three, and dependent generally upon the form and duration of the application, as, for instance, mustard or ammonia may be used so as to produce only the most transient redness, or may be made to cause blistering or suppuration. The most commonly used rubefacients are hot water, ammonia, mustard, oil of turpentine, powdered ginger, spirit of wine, camphor, chloroform vapour, &c.

RUBENS, PETER PAUL, the most eminent painter of the Flemish school, was the son of a doctor of laws and magistrate of Antwerp, who during the troubles of the Low Countries retired to Cologne. His celebrated son was born in June, 1577, at Siegen in Westphalia, whither he had been banished by cause of an intrigue with Anne of Saxony, wife of William the Silent. The family subsequently returned to Antwerp, where the subject of this article received a literary education, and early displayed a talent for art, which induced his mother, then a widow, to place him with a landscape painter named Verhaegt, who instructed him in the elements of design. Preferring, however, historical painting, he enrolled himself as a pupil of Van Noort, whom he left for the school of Otto Venius, at that time the most renowned painter in Antwerp, and with him he remained four years. During this brief period he made such rapid progress as to equal his master in skill. He afterwards, in 1600, went to Italy, where he improved himself by copying the works of the best masters, and by paying particular attention to the colouring of the Venetian school. While in Italy he remained

chiefly at the court of the Duke of Mantua, to whom he was recommended, and was employed by the duke not only as an artist but on one occasion as a special ambassador to the court of Madrid. He also visited Rome and other cities of Italy, copying some of the best pictures, and perfecting himself in every branch of his profession. After a residence of seven years in Italy he returned to Antwerp in 1608, being recalled by the illness of his mother, who died before his arrival. This event induced him to retire to the Abbey of St. Michael, where he gave himself up for a time to solitary study. His reputation now stood so high that he was called to the court of the Archduke Albert, governor of the Netherlands, who appointed him court painter, and pensioned him, soon after which he married his first wife, and lived in a style of great magnificence, which excited much envy among inferior artists, who sought to lower his reputation by attributing the best parts of his pictures to his numerous pupils. These calumnies he treated with disregard, and, aware of the source of much of the ill will, relieved the necessities of some of his principal detractors. For the cathedral at Antwerp he painted that great master-piece the Descent from the Cross, for the Jacobites, the Four Evangelists, and he continued to execute many great works with surprising facility, until in 1620 he was employed by Mary de Medici to adorn the gallery of the Luxembourg, for which he painted a well-known series of magnificent pictures, allegorically exhibiting the principal events in the life of that princess. While engaged on this work he became acquainted with the Duke of Buckingham, who afterwards purchased from him for a large sum his extensive fine-art collection. Such was the opinion of his general talents that he was chosen, at the recommendation of the Archduchess Isabella, to be the private negotiator of a peace between Spain and England, for which purpose he visited Madrid in 1628, where he was treated with great distinction. He painted for Philip IV and his minister Olivarez twelve or fourteen of his most celebrated pictures in the short space of nine months, and in 1629 he returned to Flanders with a secret commission, and proceeded to England. Although not received openly as a minister Charles I, who was both a patron and judge of the fine arts, was much gratified by his visit, and during his stay in England, where he succeeded in his negotiation, he was engaged to paint the ceiling of the banqueting house at Whitehall. He also executed several other pictures for the English nobility, some of which are to be found at Blenheim, Wilton, Easton, &c. He remained in England about a year, during which time he received the honour of knighthood, and then returned to Flanders, where he married the beautiful Helen Fourment, his second wife, and was nominated secretary to the council for the Low Countries. He maintained a highly dignified station through the rest of his life, which was one of continued prosperity, until his death at Antwerp in 1640, in the sixty-third year of his age.

Rubens, beyond all comparison, was the most rapid of the great masters, and so many pictures bear his name it is impossible not to credit a part of what was asserted in his own days, that the greater portion of many of them was performed by his pupils. His great characteristics are freedom, animation, and striking brilliancy and disposition of colouring, the favourite tone of which is that of a gay magnificence, from which, whatever the subject, he never deviated. Besides the excellence of his general powers he saw all the objects of nature with a painter's eye, and instantly caught the predominating feature by which the object is known and distinguished, and as soon

as seen he executed it with a facility that was astonishing. According to Sir Joshua Reynolds he was the greatest master of the mechanical part of his art that ever existed. His chief defects consisted in inelegance and incorrectness of form, a want of grace in his female figures and in the representation of youth in general, and an almost total absence of sublime or poetical conception of character. The works of Rubens are found in churches, palaces, and galleries throughout Europe, for every branch of the art was cultivated by him—history, landscape, portrait, and even common life. His celebrated Rape of the Salmes is in the National Gallery of Great Britain, which also contains ten others of his paintings. The number of engravings from the designs of Rubens exceeds 300. This great painter, who was no mean scholar, wrote some treatises on his art in very good Latin.—See Sir J. Reynolds's Works, Sainsbury's Original Papers Unpublished Illustrative of the Life of Rubens (1858), Gachard's Histoire de Rubens (1877), Miché's Rubens, sa Vie, son Œuvre, et son Temps (1900).

RUBICON, a river in Italy, of some celebrity in Roman history, Caesar having by crossing this stream, at that time regarded as the northern boundary of Italy, finally committed himself to the civil war. Hence the phrase 'to pass the Rubicon' is to take the decisive step by which one commits oneself to a hazardous enterprise. It is very doubtful under what modern name the Rubicon now exists, the honour being claimed by two streams—the Fiumicino and the Luso.

RUBIDIUM, a rare metal discovered by Bunsen and Kirchhoff in 1860, by means of spectral analysis, in the residue obtained by evaporating a large quantity of the mineral water of Birkheim. The metal and its salts exhibit two dark red lines in the blue part of the spectrum—hence the name, from the Latin *rubidus* = dark red. Rubidium has the atomic weight 85.4, and the symbol Rb. It is a white, shining metal, having a specific gravity of 1.52, at ordinary temperatures—even so low, indeed, as -10°C .—it is soft as wax, it is easily oxidized, when thrown on water it decomposes that liquid with evolution of hydrogen, which takes fire because of the heat produced in the reaction. Rubidium forms one of the metals of the alkalis, being analogous in its properties with potassium and sodium, its compounds also closely resemble those of these metals, thus it forms a characteristic hydrate (RbHO), which is a white, solid substance, feeling unctuous to the touch, deliquescent in the air, and dissolving in water to form a strongly alkaline liquid. Rubidium forms one chloride (RbCl), bromide (RbBr), and iodide (RbI), and in all its compounds comport itself in a manner precisely analogous with potassium and sodium.

RUBRIC, in the canon law, signifies a title or article in certain ancient law books, thus called because written, as the titles of the chapters of our ancient Bibles are, in red letters (*Lat. ruber*, red).

Rubrics also denote the rules and directions given at the beginning and in the course of the liturgy for the order and manner in which the several parts of the office are to be performed, the name in this case also being derived from the circumstance that these directions were originally written with red ink. Where red ink is not employed now the rubrics are written in italics, or in some other distinctive character. There are general rubrics, special rubrics, a rubric for the communion, &c. In the Romish missal and breviary are rubrics for matins, for lauds, for translations, for beatifications, &c.

RUBRUQUIS, GUILLAUME DE, a distinguished traveller of the middle ages, whose real name was

WILLEM VAN RUTSBROEK, was born in Brabant about 1215. He entered the cloister in early life, and soon after completing his novitiate and taking the major vows he went to the Holy Land in company with other monks and missionaries. Louis IX of France was then engaged on his unfortunate crusade, and resolved to send Rubruquis on a mission into Central Asia for the purpose of forming an alliance with Sartach, son of Batû Khan of Kiptchak, a supposed Christian prince who was then at war with the Saracens, who had possession of the Holy Land. A further reason for this mission was that Louis, as well as the Western Church generally, cherished sanguine hopes that the bulk of the Tartars were even then, or likely soon to be, converted to Christianity. Accompanied by two friars, Franciscans like himself, and an interpreter, he set out from Constantinople in the beginning of May, 1253, and on the 21st of that month landed at Soldaia (now Soujac), near Kherson. This place they quitted on the 1st of June, crossed the steppes which separate the Dnieper from the Don (part of the modern Russian province of Ekaterinoslav). On the 22d of July they reached the banks of the Don in a famishing condition, but fortunately found here fish, flesh, and bread. Crossing the river they once more plunged into the desert, and on the 2d of August came upon the encampment of Sartach, about three days' journey from the Volga. They soon discovered that the report of Sartach's adherence to Christianity was false, and that that prince was unwilling to treat with them. He sent them forward, however, to his father Batû, who was then encamped near the mouth of the Volga. Batû declared that he could not allow them to preach the gospel in Tartary, and that it would be necessary for them to visit Mangû Khan in order to obtain his permission. On the 27th of December they reached the city of the Caracî in the Gobi Desert, where Mangû Khan was then residing. Their first reception was not very promising; the great khan and the interpreter got drunk, and Rubruquis could not make himself understood to one or the other. Some days afterwards he obtained another audience, and when Mangû a short time after departed for Karakorum, a city on the east side of the river Orkhon, Rubruquis and his companions followed in his train. About the 8th of July, 1254, the travellers set out on their return journey, in the course of which they threaded the great deserts of Mount Caucasus, crossed the Araxes, and traversed Armenia, Persia and Asia Minor, they reached Tripoli in Syria in August, 1255. As King Louis had returned to France Rubruquis wished to follow him in order to communicate the result of his mission, but the Franciscan provincial, a strict disciplinarian, would not permit him to leave the East, and directed him to send a written report. To this severity we owe the interesting account which he drew up, a translation of which is to be found in the *Pilgrims of Purchas* (four vols. folio, London, 1626). The best modern edition is that of Francisque Michel and Thomas Wright, in the fourth volume of the *Recueil de Voyages et Mémoires de la Société de Géographie* (1839). He died some time after 1293.

RUBY, a precious stone, of which there are three varieties—the oriental, the balas, and the spinel ruby. The oriental ruby, which is the only true ruby, ranks first for price and beauty among all coloured stones. When its colour is of good quality it has the vivid tint of arterial blood (a tint called pigeon's blood in commerce), or of the very centre of the red ray in the solar spectrum. It is very hard, and after the diamond and the sapphire, which latter surpasses it only a little in this respect, it is the hardest of precious stones. When a perfect oriental ruby of

5 carats enters the market it will bring double the price of a perfect diamond of the same weight, and if a ruby reaches the weight of 10 carats it will bring triple the price of a diamond of equal weight (£800 to £1000). A perfect ruby is, according to many authorities, the most rare of all the productions of nature. When Pegu became part of the British possessions it was believed that Europe would receive at least a part of the rubies which had been for so many centuries locked up in that country. That hope was completely disappointed, but better results have followed the acquisition by Britain of the whole of Burmah. Rubies are also found in Ceylon in alluvial deposits, and at Badakshan in Bactria. In composition the spinels and the balas ruby differ essentially from the oriental ruby, the latter being a corundum, formed nearly exclusively of alumina, while in the two former only about 70 parts in 100 are alumina. (See SPINELLE.) The largest known ruby is one mentioned by Chardin. One in the possession of the Shah of Persia is said to weigh 175 carats. A third, belonging to the King of Bejapur, was bought in 1653 for nearly £3000. But doubts exist as to the genuineness of these. A ruby presented by Gustavus III of Sweden to the Czarina in 1777, at the time of his visit to St Petersburg, was the size of a small hen's egg.

RUBY-TAIL (*Chrysus unita*), a species of Hymenopterous Insect, belonging to the group *Tubulifera* of that order, in which the abdomen is converted into a tubular organ bearing a sting or ovipositor at its extremity. Both sexes of these insects possess antennæ composed of thirteen joints, and the antennæ are bent at their extremities. The Ruby tail is a familiar British insect. The thorax exhibits metallic lustres of blue and green, and the abdomen is coloured a characteristic red—from the presence of which the familiar name of 'ruby tail' has been derived. These insects are of small size. In summer they inhabit walls, wooden palings, and dry situations generally. Their larvae are parasitic on wild bees and allied Hymenoptera, and appear to feed on the food stored up by the bees, as well as infesting the bees themselves. Between the bees and Ruby tail larvae a deadly warfare is carried on, the latter defending themselves by coiling up their bodies in the form of a ball. The wings of the perfect Chrysis are sometimes cut off by the bees, and it is stated that in this maimed condition the Ruby tail will gain admittance to the nest of the bees, and deposit its eggs, even after being thrown or ejected from the hive. The name of 'cuckoo-flies' is sometimes also given to the Ruby tails, on account of their imitating in a manner the intrusive habits of the Cuckoo in forcing themselves into the dwellings of other insects.

RUBY THROAT (*Trochilus colubris*), a species of Humming bird, so named from possessing the chin and throat of a brilliant ruby red colour. This elegant little bird attains an average length of 3 inches. The back is coloured with golden green lustre, the lower surface is whitish, the tail and wings being of a purple brown shade. In summer this form is found spread over the entire continent of North America, extending to the fifty-seventh degree of latitude, in the Hudson's Bay Company's territories, and it is thus remarkable for its extensive distribution, no less than for its characteristic coloration.

RÜCKERT, FRIEDRICH, a German poet and orientalist, was born at Schweinfurt (Bavaria), on May 16, 1788. His earlier education he received at his native town, and he subsequently studied in the universities of Würzburg and Heidelberg. After some time spent in teaching he turned his attention

to literary pursuits, and from 1815 to 1817 was one of the chief editors of the *Morgenblatt* at Stuttgart. In 1818 he went on a visit to Rome, and after his return married and settled at Coburg, where he applied himself with great zeal to the study of oriental languages. In 1826 he was made professor of oriental languages at Erlangen, and in 1841 went to Berlin in the double character of privy-councillor and professor. In 1849 he retired from public life, and took up his abode at his estate of Neuses in Coburg, where he remained till his death, devoting himself to poetry and oriental research. His death took place on the 31st of January, 1866. Rückert began his career as a poet under the pseudonym of Freimund Ramar with his *Deutsche Gedichte* (Heidelberg, 1814), which was followed by *Napoleon eine politische Komödie in drei Stücken* (Stuttgart, 1816). Under his own name he published *Kranz der Zeit* (Stuttgart, 1817), *Oestliche Rosen* (Leipzig, 1822), *Gesammelte Gedichte* (six vols. Erlangen, 1834-38). The fruits of his oriental studies were his translations of *Hariri's Makâmât* under the title of *Die Verwandlungen des Abu Seid* (two vols. Stuttgart, 1826), of the *Juhn tale Nal und Damajanti* (Frankfort, 1828), *Hamasa, oder die ältesten arabischen Volkslieder, und Amrîkais der Dichter und König* (Stuttgart, 1847). Original poems of his, relating to the East, are *Morgenländische Sagen und Geschichten* (two vols. Stuttgart, 1837), *Erbauliches und Beschauliches aus dem Morgenland* (two vols. Berlin, 1837), *Rostem und Suhrah eine Heldengeschichte* (Erl. 1838), *Brahminische Erzählungen* (Leipzig, 1839), *Die Weisheit des Brahmanen* (six vols. Leipzig, 1836-39), and *Das Leben Jesu* (Stuttgart and Tübingen, 1839), a kind of harmony of the four Gospels. After these appeared his dramas *Saul und David* (Erl. 1843), *Herodes der Grosse* (two vols. Stuttgart, 1844), *Kaiser Heinrich IV.* (two vols. Frankfurt, 1845), and *Cristoforo Colombo* (two vols. Frankfurt, 1845). His last works were *Ein Dutzend Kampfheder für Schleswig Holstein*, published anonymously (Leipzig, 1864), and *Sawitri* (1866). After his death there appeared *Lieder und Sprüche* (Frankfort, 1866), and *Aus dem Nachlasse Friedrich Rückerts* (Leipzig, 1867), the latter containing translations of Theocritus, the Birds of Aristophanes, and the *Sâkuntala* of Kalidasa. More recently published works are a part translation of the *Koran* (1888), *Kindertotenlieder* (1872), translation of Saadi's *Bostan* (1882), *Poetisches Tagebuch* (1888), *Indos's Königsbuch* (1890-95), *Aus Saadi's Divan* (1893), and Saadi's *Politische Gedichte* (1894). Among recent editions of his works is that of Laistner (six vols. 1895-96). Rückert attempted successfully almost every species of verse—the Greek hendecasyllable, the old Norse alliterative, the old German couplet, the Nibelungen strophe, the popular ballad, &c.

RUDDER. See HELM.

RUDDER FISH (*Caranx Carangus*), a Teleostean fish allied to the Scomberidae or Mackerels, and deriving its name from its habit of swimming around the sterns of ships, attracted, doubtless, by the refuse thrown overboard. This fish—which shares the name Rudder fish with another form, the *Pammelas perezformis* of North American seas—is coloured silvery white and blue. The lateral line is covered by a row of spinous scales. The flesh is said to be coarse in flavour, but is described as being otherwise palatable. The Cobbler fish (*Caranx ciliaris*), so named from its long awl-like spines of its dorsal fins, is an allied species, and is found in the Red Sea and Indian Ocean.

RUDDIMAN, THOMAS, a celebrated philologist and Latin grammarian, was the son of a respectable farmer, and born at a place called Raggel, in the

parish of Boyndie, county of Banff, in 1674. In 1694, after having graduated as M.A. at Aberdeen, he was appointed parish schoolmaster at Laurencekirk. While occupying that situation he became acquainted with the celebrated Dr Pitcairne, by whom he was invited to Edinburgh. He repaired to the metropolis in the beginning of the year 1700, and on his arrival Dr Pitcairne procured him employment in the Advocates' Library, to which he was appointed two years later assistant librarian. He now set himself to the task of improving his circumstances by literary industry, and the situation he was in eminently favoured such a design. He copied chronicles and chartularies for the Glasgow University, which gave him constant and regular employment in this way. He formed connections with booksellers, and revised, corrected, and enlarged the works which they were publishing, particularly those of a learned character. The first work to which he is known to have lent his assistance was Sir Robert Sibbald's *Introductio ad Historiam Rerum a Romanis gestarum in ea borealis Britanniae Parte quæ ultra Murum Picticum est*. He was next employed to revise *The Practiques of the Laws of Scotland*, by Sir Robert Spottiswood. His remuneration, however, for all his work was so small that in 1707 he turned auctioneer. In the same year he published an edition of Wilson's *De Animi Tranquillitate Dialogus*. To this work he added a new preface, and subjoined a sketch of the life of Wilson. In 1709 he published a new edition, with notes, of *Johnstoni Cantici Solomonis Paraphrasis Poetica*, which he dedicated in a copy of verses to his patron Dr Pitcairne. He afterwards published an edition of the famous poetical translation of Virgil's *Æneid*, by Bishop Gawan Douglas. To this work, besides superintending and correcting the press, he contributed a glossary, explaining difficult and obsolete words, a performance which bespeaks great depth of research and soundness of judgment. In 1711 he assisted in preparing a new edition of the works of Drummond of Hawthornden, and immediately after lent his aid to Abercromby to publish his *Martial Achievements of the Scots Nation*. In 1713 he published a new edition of the *Latin Vocabulary* of John Forrest, with improvements. In the year following he published a work which was then much required for Scottish schools, and which at once stamped him as a Latin scholar of the highest rank. This was his *Rudiments of the Latin Tongue*, which he lived to see go through no less than fifteen editions. It is almost unnecessary to add that it immediately supplanted all works of a similar kind which had been previously in use, every one of which was singularly defective, and that till recent times it has remained in extensive use throughout the grammar schools of Scotland. Shortly after this he was employed to edit Buchanan's *Opera Omnia*, now collected for the first time. To this work, which was published in 1715 in two vols. folio, he contributed large annotations, in which he treated freely both the character and political principles of the author, a proceeding which raised him a host of enemies, and involved him in an acrimonious and annoying controversy. In 1715 he added to his other vocations that of printer, admitting a younger brother of his own, who had been bred to the business, as a partner of the concern. The first production of his press was the second volume of Abercromby's *Martial Achievements*. Amongst the learned works of note which he printed subsequently were the first volume of *Epistolæ Regum Scotorum* (1722), for which he wrote a preface, *Ovidii Excerpta ex Metamorphoseon Libris*, containing English notes by Willymot and himself (1723), *Herodian* (1724), volume first of his own *Grammaticæ Latine Institutiones* (1725), which

brought him a great accession of fame and profit, volume second appearing in 1731 (both 8vo), and an abridgment in 1740. An edition of the *Institutiones* was published at Leipzig in 1823 by G. Stallbaum. He printed, in 1733, a Dissertation upon the Way of Teaching the Latin Tongue, and in 1751 appeared his edition of *Livy*, in four vols 12mo, which, from its typographical accuracy, has been termed the 'immaculate' edition. In 1728 he was nominated, conjunctly with James Davidson, printer to the university, and in 1730 chief librarian to the Society of Advocates, a post from which he retired only in 1752. In 1724 he began to print the continuation of the *Caledonian Mercury* for Rolland, who was then its proprietor, and in 1729 he acquired the whole interest in the paper, which continued in his family till 1772, when it was sold by the trustees of his grandchildren. Amongst the last of his literary labours was an elaborate introduction to Anderson's *Selectus Diplomatum et Numismatum Scotiæ*. The *saurus*, an able and learned work on Scottish charters, seals, coins, &c. He died at Edinburgh on the 19th January, 1757, aged eighty three.

RUDESHEIMER. See RHEINISH WINES

RUDOLPH. See RUDOLPH

RUDOLSTADT, a town in Germany capital of the principality of Schwarzburg Rudolstadt, pleasantly situated between hills, on the left bank of the Saale, here crossed by a bridge 16 miles south of Weimar. The chief buildings are a fine thirteenth-century church, restored in 1879, with interesting monuments, the prince's castle, with a collection of paintings, a library, and the state archives, another castle with a rich natural history collection, the government buildings with the public library of 65 000 volumes, the post office, gymnasium and other schools, court theatre, school of music, &c. There are manufactures of woollen cloth, porcelain and tile works, breweries, tanneries, &c., and a trade in wood, fruit, and garden produce. Pop. (1895), 11,907.

RUE (*Ruta graveolens*, natural order Rutaceæ), a strong scented plant, cultivated in gardens. The root is perennial, woody, the stems about 2 feet high, bearing alternate petiolate, and divided leaves, the flowers are yellow and disposed in corymbs at the summit of the branches, the calyx is persistent, and divided into four or five segments, the corolla consists of as many oval petals, and is longer than the calyx, the stamens are eight or ten, and the style single. The odour of rue is strong and penetrating, and the taste acrid and bitter. It has been employed medicinally on account of its antispasmodic, anthelmintic, and emmenagogue properties. Notwithstanding its disagreeable taste and odour, the leaves were employed for culinary purposes by the ancient Romans, and even now enter into the composition of certain dishes, and especially of salads, in some parts of Italy and Germany. About twenty species of rue are known.

RUFF (*Machtes pugnax*), a Grallatorial or Wading Bird, belonging to the sub family of the Tringinae or Sandpipers, and noted not only for the disposition of the neck feathers, but also for its pugnacious disposition. The plumage varies greatly in colour—so much so, indeed, that these variations have been erroneously described in some cases as representing new and distinct species. The average length of the Ruff is about 10 or 12 inches, the bill being about 1 inch long. These birds were formerly much more abundant than now in Britain. They are birds of passage, appearing at certain seasons of the year and in great numbers in the north of Europe. They are generally taken in large nets. When fattened they are dressed like the woodcock, without withdrawing their intestines or their contents, which are

considered by the connoisseurs as affording the most delicate kind of seasoning for these birds. The males are polygamous, and are much more numerous than the females, which latter are termed Reeves, and during the pairing season the males have numerous and severe conflicts for the possession of their mates. These combats are thus described by Pennant and other writers—The male chooses a stand on some dry bank near the water, round which he runs so often as to make a bare circular path, the moment a female appears in sight all the males within a certain distance commence a general fight, placing their bills to the ground spreading their ruff and using the same action as the common cock. This pugnacious disposition is so strong that, when they are kept for the purpose of fattening, their place of confinement is obliged to be dark as the moment any light is admitted they attack each other with such fury, and fight with so much inveteracy, as to occasion a great slaughter. The female lays four eggs forming her nest in a tuft of grass, and incubates about a month. The ruff is formed by the neck feathers, which the males develop specially at the breeding season, and which imitate somewhat the form of the neck ornament of that name worn in olden times. The ruff is not developed until the second year of the male's life, and previously to that period the males much resemble the females in general appearance. These birds were at one time captured by fowlers in the fen districts of England in large numbers, and used to fetch, when well fed, from 30s. to 2 guineas per dozen in the London markets. But Montagu writing in 1813, says that the supply was then so small as hardly to remunerate the fowlers for their exertions, and now they are merely passing visitors in Britain. In their polygamous, as also in their pugnacious habits, the Ruffs present exceptions to the great majority of Grallatorial Birds: the polygamous habits, indeed being the chief cause of the combats in which the male birds engage.

RUFFE (*Acerina cernua*) a fish inhabiting many English rivers, and included in the family of the Percida or Perches. It is sometimes known as the Pope, but the origin of neither name is ascertained. In general form it closely resembles the Perch. Its average length is about 6 or 7 inches. It possesses a single or continuous dorsal fin, the fins generally being spotted, and no dark bands existing on the sides as in the Perch. The colour is light olive brown on the upper, and silvery white on the lower parts, the sides being of a yellowish brown colour. The fins possess little brown spots, which in the tail fin are closely set and appear like bars. The gill covers are of a pearly green hue. The flesh is very palatable. The Ruffe is a bold fish, and may be readily caught by red worm bait.

RUGBY, a town in Warwickshire, England, 15 miles north east of Warwick, pleasantly situated on a slope above the left bank of the Avon, on the London and North Western, Midland, and Great Central Railways. There is here a parish church (rebuilt in 1879) with an ancient massive square embattled tower, a handsome modern district church, several other places of worship, a free public library, a hospital, and a public school occupying a splendid range of buildings in the Elizabethan style, possessed of an endowment estimated at £5500 per annum, and now ranking, mainly through the exertions of the late Dr Arnold, as one of the most celebrated schools of England. The railway station is an extensive and handsome structure. Rugby partly derives its importance from its school, which has induced many opulent families to settle in it. It has electrical engineering and cement works.

Pop in 1881, 9890, in 1891, 11,262, in 1901, 16,830

RUGELEY, a market town in Staffordshire, England, 7 miles north west of Lichfield, and a station on the Trent Valley Railway, pleasantly situated on the Trent. It has a market hall, town offices, several endowed schools and other charities. Iron founding is carried on, and there are extensive collieries in the vicinity. Pop (1891), 4181, (1901), 4447.

RÜGEN, an island belonging to Prussia, in the Baltic, off the north west coast, in the province of Pomerania, from which it is separated by a channel varying in width from $\frac{1}{2}$ mile to 2 miles, the area is 322 square miles. It is very irregular in shape, and indented by a series of bays and creeks, but the water is so shallow, and the coast so much encumbered with sand banks, that it possesses no good harbour. The surface, unlike that of the main land of Pomerania, which is flat and uninteresting in the extreme, exhibits a beautiful variety of hill and dale, and has many well wooded slopes and wild romantic ravines. The loftiest height, called the Stubbenitz, is situated at the north east extremity of the island, and has a height of about 550 feet, forming a bold and precipitous chalky cliff, from the top of which a flight of steps down in the rock leads down to the sea shore. Like this cliff, all the rocks of the island belong to the cretaceous system, and have contributed, by their decomposition and intermixture with vegetable and alluvial loams, to form a soil of remarkable fertility, equally adapted to agriculture and to grass husbandry, and enabling the inhabitants to export both grain and cattle to a considerable amount. The fisheries also are very valuable, and give employment to a large number of the inhabitants. The facilities the island affords for sea bathing attract a number of visitors. In early times Rügen was held sacred to the goddess Hērtha, and a small lake surrounded by trees is still pointed out as having been her principal abode. During the Thirty Years' war the Swedes gained possession of the island, and retained it till 1815, when it was ceded to Prussia. Administratively it is attached to the government of Stralsund and forms with several small adjacent islands, the circle of Rügen. Bergen is the capital. Pop (1895), 16,723.

RUGENDAS, (GEOFF PHILIP), one of the most famous of battle painters, was born at Augsburg in 1666. After six years' study of his art his right hand became disabled, but he continued to work with the left. He painted and engraved much. His pictures are full of spirit and ease, there is an endless variety in the attitudes of his horses. Such was his zeal for art that during the siege of Augsburg in 1703 he freely exposed himself amid the fire and carnage that he might be able faithfully to delineate the scenes around him. Among his engravings, all laboured with uncommon care, are distinguished six large ones representing this siege. He died at Augsburg in 1742. His sons Georg Philipp (died 1774) and Christian (died in 1781) are also known as engravers.

RUGOSA, an order of Actinozoa (= Coelenterata, which see), represented almost solely by extinct corals, which, with one exception (*Holocystis elegans*, from the Lower Cretaceous or Chalk System), are chiefly confined in their distribution to rocks of Palaeozoic age. The corallum or coral structures—which of course are the only parts preserved in a fossil state, and therefore the only portions of these organisms known to us—was of the most typical or *sclerodermic* kind. Such corals are represented in essential structure by the existent *Cyathophyllar*, *Madreporide*, &c., and are those on which the process of reef-building essentially devolves. The sclerodermic corallum is further distinguished by its being truly secreted within the organism, and being formed by the tissues of the beings which secrete it. (See *SCLERODERMIC CORAL*.) The theca or outer wall of Rugose Corals was well developed, and the vertical *septa*, or partitions which exist within the theca, were prominent, and were present in multiples of four. Recent sclerodermic corals possess these *septa* in multiples of five or six. Very frequently, in addition to the vertical *septa* which divide the interior of the coral into chambers or *loculi*, certain other partitions, named *tabulae*, dividing the theca horizontally into chambers, were developed. Indeed, those *tabulae* are seen most typically in Rugose Corals, and when *tabulae* are developed the *septa* themselves may be found wanting. In the latter case the name *tabulate* would be applied to these corals.

In Rugosa no true *arenchyma*, or general coral-substance binding together the various corallites or members of a compound mass, is developed. Many Rugosa are simple and distinct organisms, but compound forms, produced by gemmation or budding from the sides (*parietal*) or from the mouth regions (*calicular* gemmation) of pre-existing organisms, are also to be noted.

As regards the distribution in time of the Rugosa it may be remarked as a general fact that, with very few exceptions, the great majority of Palaeozoic corals belong either to the Rugosa or to an allied division (*Tabulata*) of the *Zoantharia Sclerodermata*—this last being a chief division of the order *Zoantharia*, a companion order to the Rugosa itself. Lastly the existence of two genera of living corals (*Haplophyllia* and *Guymia*) belonging to the Rugose order has been demonstrated in modern seas. And in the recent Tertiary rocks fossil members of Rugosa have been found and described. The family *Cyathophyllidae* is the best known of Rugose corals, and its members occur as fossils in the Silurian, Devonian, and Carboniferous rocks. The *Cyathaxomidae* belong to the Silurian and Carboniferous systems, and to this group have been referred the two living forms of the Rugosa already mentioned. The family *Stauridae* is represented in the Silurian and Devonian formations (genera *Stauria* and *Mitrophyllum*), in the Permian rocks by *Polycalca*, and in the Tertiary system by *Comomelia*. The fourth and last family, *Cystiphyllidae*, is solely of Silurian and Devonian age. In the Stauridae and *Cyathophyllidae* the corallum may be simple or compound, but in *Cyathaxomidae* and *Cystiphyllidae* it is invariably of simple character.

RUHMKORFF'S COIL. See *INDUCTION COIL*.
RUHNKEN, DAVID, professor of history and eloquence in the University of Leyden, one of the most celebrated classical scholars of his time, and especially distinguished for his simple, beautiful, classic Latin style, was born in 1723 at Stolpe, in Pomerania. His opulent parents designed him for study and sent him at first to Königsberg, where he made himself acquainted with classic authors of antiquity. In his eighteenth year he went to Wittenberg, and studied with eagerness the philosophy of Wolf. Two years after he went to Leyden, to enjoy the instructions of the celebrated Hemsterhuis in the Greek language. There he spent six years, and devoted himself wholly to classical studies, under the guidance of his great teacher. The first fruits of his application were two *Epistolæ criticae* (1749 and 1751), the subject of the first of which was the Homeric hymns, Hesiod, and the Greek anthology, of the second Callimachus, Apollonius, and Orpheus. It was now his wish to obtain a philosophical professorship in some Dutch university, but, having no prospect of such an appointment, he resumed, at the advice of Hemsterhuis, the study of the Roman

law, which he had begun in Wittenberg. But he was not altogether diverted from Greek literature, and in pursuance of this favourite study he undertook an edition of Plato. For this end he procured from the library of Sangermann, at Paris, a transcript of the only existing copy of Timeus's Lexicon of Plato, and published it, with a commentary (Leyden, 1754 and 1789). This work was sufficient to give Ruhnken a rank among the first philologists of his times. So much critical and grammatical erudition had rarely been found condensed into so narrow a space. As he had become fond of his easy life in Holland Ruhnken declined several honourable offers of professorships in foreign countries, and devoted his leisure to a literary tour, with the intention of consulting the principal libraries of Europe. For a year he laboured amid the treasures of the royal library of Paris, where, with unwearied industry, he transcribed and collated manuscripts, and made excerpts from them. Hemsterhuis had meanwhile found opportunity, as he was now oppressed with age and sickness, to get Ruhnken appointed assistant lecturer on the Greek language, the duties of which he discharged for a period of four years with great skill and success, and in 1761, on the death of Oudendorp, he was appointed professor of history and eloquence. Of his numerous works, among which are his Memoir of Hemsterhuis, and his edition of Muretus, the most celebrated is his Vellensis Paterculus (Leyden, 1779)—a true model for the treatment of Latin classics. The edition of Plato that he had begun was not very far advanced when death put an end to his activity, in 1798.

RUHR, a river of Prussia, an affluent of the Rhine, which it joins on the right bank at Ruhrort, about 19 miles north of Düsseldorf. It rises in Westphalia, in the government of Arnsberg, having its source in the Rothlager or Rothlager Gebirge. It flows west is joined on its right bank by the Mohne, and on its left by the Lenne. Its total course, which is very tortuous, about 130 miles.

RUHRORT, a town of Rhenish Prussia in the government of Düsseldorf, situated at the confluence of the Ruhr with the Rhine. It contains a castle, and has manufactures of cotton goods, ship yards, machine shops, and a trade in corn, wood, wool, and coal, particularly the last, obtained from a valuable coal field in the neighbourhood. Pop. (1897) 11,708.

RULE BRITANNIA. The words of this national song form part of the masque entitled Alfred, the joint production of James Thomson and David Mallet, which was first performed before Frederick, prince of Wales, at Chisden House, 1st August, 1740. The music of the masque was written by Dr. Arne, but various authorities hint that the air of this patriotic ode is an adaptation of one of the movements of a now neglected work of Handel's.

RULE NISI, in English law, a term denoting the first step in an interlocutory application to the court, such as an application for a new trial. The party who takes the initiative generally moves *ex parte* for an order of the court that something shall be done, unless the opposite party within a certain time, usually three or six days, show cause why the thing proposed should not be done. The party obtaining a rule nisi sends a copy of it to the opposite party, who is bound at the time appointed to offer some good reason why the thing should not be done, and if the cause is deemed insufficient, the rule is made *absolute*, which means that the opposite party must do the thing demanded, otherwise he will be liable to fine or imprisonment, according to the nature of the case.

RULE OF FAITH, in polemical theology, the term applied to what is considered the code from which the Christian faith is to be derived. The

Reformers held that the Scriptures alone could be safely accepted as a rule of faith. Roman Catholics, while admitting that the Bible alone is the true rule of faith, hold that the traditions of the church, contained in the writings of the fathers, the decrees of councils, and the decretals of the popes, are a depositary of the teaching of our Lord, less accessible certainly, but when unanimous not less binding than the Bible itself. Protestants acknowledge the authority of Christ, his apostles, and all inspired writers, but deny that any doctrine not contained in the Scriptures has any binding authority. Certain members of the English Church admit what they call the consent of the fathers as an authoritative interpretation of the Scriptures.

RULE OF THREE, in arithmetic, called by some authors the *golden rule*, is an application of the doctrine of proportion to arithmetical purposes, and is divided into two cases, *simple* and *compound*, now frequently termed *simple* and *compound proportion*.—Simple rule of three, or simple proportion, is when from three given quantities a fourth is required to be found, that shall have the same proportion to the given quantity of the same name, as one of the other quantities has to that of the same name with itself. This rule is by some authors divided into two cases, namely, *the rule of three direct* and *the rule of three inverse*, but this distinction is unnecessary, and the two cases are now generally given under one head by the best modern authors, but as they are still retained by others it will not be amiss to point out the distinction. The rule of three direct, is when more requires more, or less requires less, as in this example: 'If three men will perform a piece of work, as, for instance, dig a trench 48 yards long, in a certain time, how many yards will twelve men dig in the same time?' where it is obvious, that the more men there are employed, the more work will they perform, and, therefore, in this instance, more requires more. Again, 'If six men dig 48 yards in a given time, how much will three men dig in the same time?' Here less requires less, for the less men there are employed the less will be the work that is performed by them, and all questions that are in this class are said to be in the rule of three direct.—The rule of three inverse, is when more requires less, or less requires more, as in this case: 'If six men dig a certain quantity of trench in fourteen hours, how many hours will it require for twelve men to dig the same quantity?' or thus, 'If six men perform a piece of work in seven hours, how long will three men be in performing the same work?' These cases are both in the inverse rule, for in the first more requires less, that is, twelve men being more than six, they will require less time to perform the same work, and in the latter, the number of men being less, they will require a longer time. All questions of this class are said to belong to the rule of three inverse. These two cases, however, as we before observed, may be brought under one general rule, as follows.—Rule. Of the three given terms, set down that which is of the same kind with the answer towards the right hand, and then consider from the nature of the question, whether the answer will be more or less than this term. Then, if the answer is to be greater, place the less of the other two terms on the left, and the remaining term in the middle, but if it is to be less, place the greater of these two terms on the left, and the less in the middle, and in both cases multiply the second and third terms together, and divide the product by the first term for the answer, which will always be of the same denomination as the third term. If the first and second terms consist of different denominations they must both be reduced to the same, and if the third term be a compound

number it is generally more convenient to reduce it to the lowest denomination contained in it.

RUM, the distilled liquor obtained from the fermented juice of the sugar cane or molasses. The following is the process employed in Jamaica.—The materials for fermentation are molasses, scummings of the hot cane juice, or sometimes raw cane liquor, lees, or *dunder* as it is called (derived from former distillations), and water. The wort, or liquor before fermentation, is made by adding, say, to 1000 gallons of dunder 120 gallons of molasses, 720 gallons of scummings, and 160 gallons of water, so that the liquid may contain from 12 to 16 per cent of saccharine. The fermentation, which is produced principally by the fresh cane juice present in the mixture, then proceeds uniformly for a space of from nine to fifteen days, according to circumstances. When the liquid has nearly reached its maximum degree of thinness it is pumped into the still, and heat applied until all the spirit has run off. The first spirit, called *low wines*, is rectified in a smaller still. It is usually distilled at about forty per cent over proof. Rum owes its flavour to a volatile oil and butyric acid, a fact which has been taken advantage of to prepare a butyric compound called essence of rum to enable the spirit dealer to manufacture a fictitious rum from malt or molasses spirit. The colour is usually imparted after distillation by adding burnt sugar or caramel. *Pine apple rum* is a finer quality of ordinary rum, into the puncheons containing which sliced pine apples have been introduced. The duty on rum imported into Great Britain is 10s. 10d. per gallon if from British possessions and from the country of its production, if not from the country of its production 6d. additional is charged. The annual imports of rum into the United Kingdom amount to between 6 and 7 millions of proof gallons, three fourths from British Guiana and Jamaica.

RUM, an island of Scotland, in the county of Inverness, one of the Inner Hebrides, about 6 miles south of the Isle of Skye. It is of somewhat irregular form, and about 18 or 20 miles in circumference. It consists of a group of high hills rising out of the sea, scarcely diversified by an intervening valley, most of the hills are rough and craggy, and only about 6 per cent of the area is under cultivation. About the middle of the island are several lakes, some of them abounding in small trout. The coast is bold and rocky, particularly on the south and west where it is faced with one continued rampart of rock. During the second quarter of the nineteenth century Rum was a large sheep farm, but most of the surface is now a deer forest. Pop (1891) 53.

RUMANIA. See **ROUMANIA**.

RUMELIA, or **RUMILI** (land of the Romans), a former political division of Turkey in Europe comprising ancient Thrace and part of Macedonia.

RUMELIA, **EASTERN**, a province of European Turkey established with administrative autonomy, by the treaty of Berlin, 1878, but now united with Bulgaria, and known also as Southern Bulgaria. It is bounded on the north by the Balkan range, on the east by the Black Sea, on the south by a line beginning at Cape Sestyn about lat. 42° 20' N. and proceeding west south west to the Rhodope Mountains, and on the west by the watershed between the Maritza and the Karasu. Originally it was arranged that the province was to be under the direct political and military authority of the sultan, but it was to be administered by a Christian governor general appointed for five years by the Porte, subject to the approval of the European powers. This arrangement took effect and continued for a few years, but in 1885 the government was overturned by a popular

movement and a union with Bulgaria carried out, in which the Porte has acquiesced. The capital is Philippopolis. The area is 13,700 square miles, and the pop. in 1900 was 1,091,854.

RUMFORD, **BENJAMIN THOMPSON**, **COUNT**, was born in North Woburn, Massachusetts, on March 26, 1753. He acquired when young a knowledge of physics by the aid of the professor of that science in Harvard College, Cambridge, U.S. He then employed himself as a teacher, till in 1772 he was raised to independence by an advantageous marriage, when he became a major in the militia of his native province, and when the war took place between Great Britain and her colonies his local knowledge enabled him to render services of importance to the English commanders. He went to England, and as a reward for his services obtained a situation in the foreign office under Lord George Germain. He became under secretary for the colonies in 1780, and was shortly afterwards appointed lieutenant colonel of the king's American Dragoons. Returning to England in 1783, he retired on half pay. In 1784 he was knighted and went to the Continent. Through the recommendation of the Prince of Zweibrücken (afterwards King of Bavaria) he entered into the service of the reigning Elector palatine and Duke of Bavaria, when he effected many important and useful reforms in both the civil and military departments of the state. As the reward of his success he received from the sovereign of Bavaria various orders of knighthood was made a lieutenant general, and created Count Rumford, the title being chosen by himself from the name of his wife's native town (now Concord). He left Bavaria in 1795, and returned to England, where he employed himself in making experiments on the nature and application of heat, and on other subjects of economical and philosophical research. Among the objects which engaged his attention was the search for a remedy for smoky chimneys, which at that time formed one of the greatest nuisances in the country, and he succeeded in discovering the principles upon which fireplaces and chimneys have since been constructed. He likewise suggested the plan and assisted in the foundation of the Royal Institution, which led to other establishments of a similar description. In 1802 he removed to Paris, where he took up his residence, and, his wife being dead, he married the widow of the celebrated Lavoisier, but the union proved unfortunate, and a separation ere long took place. Count Rumford then retired to a country house at Autun, about 4 miles from Paris, and there devoted his time to the embellishment of his domain and to the cultivation of chemistry and experimental philosophy. He died August 25, 1814, leaving by his first wife a daughter, who resided chiefly at Concord, in the United States. Count Rumford was by no means a man of extensive learning, but he was familiar with the discoveries and improvements of contemporary science, and the industry and perseverance with which he pursued his inquiries enabled him to make some considerable additions to our knowledge of chemistry and practical philosophy. An edition of his works in five vols. with memoir by G. G. Ellis, was published at Philadelphia in 1870-75.

RUMINANTS, or **RUMINANTIA**, a well defined group of Mammals, distinguished as a group by the following characters.—In most no incisor or canine teeth exist in the upper jaw, the place of these teeth being supplied by a hardened or callous pad of gum, against which the lower incisors bite. Six incisors exist in the lower jaw. Canines are always present in the lower jaw and are usually inclined forwards and towards the incisors, which they nearly resemble in

form. The general number of lower canine teeth is two. The molar and premolar teeth number six on each side of each jaw, and possess flattened crowns topped by two double folds of enamel of an irregular crescentic shape. The stomach is of compound nature—that is, exhibits a differentiation into compartments, usually four in number. The caecum is of large size. The placenta (which see) is in the main *cotyledonary*, and in all cases non-deciduate. The camels have a diffuse placentation, and are exceptions, along with several other Ruminant forms (for example, *Tragulidae*, or so called Musk deers), to the general rule of placentation among Ruminantia. The feet in Ruminants are 'cloven,' that is, the foot consists of two toes encased in hoofs, and from their symmetrical nature presenting the well-known 'cleft' appearance. These functional toes in Ruminants are the third and fourth, and two rudimentary toes may or may not be present, and placed on the back of the foot (as in *Caricornia*), in addition to the two developed toes. The meta-carpal bones of the functional toes of the fore feet, and the metatarsal bones of those of the hind limbs, are ossified together to form the single 'cannon' bone. Horns are present in the majority of Ruminants, and are developed in pairs. The bony supports or 'cores' of the horns consist of processes or outgrowths of the frontal bones, except in the Giraffes.

The most marked exceptions to these general characters of Ruminants are presented by the Camels, by the Moschidae, or Musk deer family, and by several of the true Deers. Thus in their dentition the Camels and Llamas, forming examples of the family Camellidae, show two canine like upper incisors, and two upper canine teeth as well. The canines in these forms are further distinct from the incisors. The premolars in the Camels number four in the upper and two in the lower jaw, and the molars exist to the usual number of six in each jaw. In the Llamas the premolars and molars together number fourteen in all. The differences in placentation have already been referred to. Among the Deers the group *Tragulidae*, generally united with the genus *Moschus*, or that of the true Musk deer, possess two canines in both jaws, and the upper canines are generally developed to form tusks. The Muntjac (*C. Muntjac*), included in the family of the true Deer (Cervidae), possesses also two prominent canine teeth in the upper jaw.

Regarding the zoological position of the Ruminantia as a group, it may be noted that in former systems of Mammalian classification these forms were usually considered to represent a distinct and separate order, just as no doubt they constitute of themselves a natural group with sufficiently defined boundaries. In relation, however, to other and allied Mammalian forms, modern taxonomists rightly recognize other points in which the Ruminants, whilst preserving their individuality as a group, become related to neighbouring groups of more or less distinct kind. And accordingly, in the most recent of Mammalian classifications the Ruminantia are classified as a subdivision of the great order of the Ungulata or 'Hoofed' Quadrupeds (See UNGULATA). This order is divisible into the Perissodactyla or 'uneven-toed' forms, and the Artiodactyla, or those possessing an even number of digits, and the latter section in turn is divided into the groups Non ruminantia or Omnivora (Pigs, Hippopotami, &c.) and Ruminantia. Ruminants are therefore Artiodactyle Ungulata, and are represented by five families. These are the Camellidae or Camels, the Moschidae (or Tragulidae) or Musk deers, the Cervidae or True Deers, the Camelopardalidae or Giraffes, and the Cavicornia, or Sheep, Oxen, Goats, and Antelopes.

The structure of the stomach offers the chief point of interest in considering the general relations of this

group. The Ruminant stomach presents us with a compound form of that organ, its four compartments, although popularly spoken of as separate 'stomachs,' being merely subdivisions of the one and single organ. The stomach of such a familiar Ruminant as the ox or sheep consists firstly of a large compartment—the largest of the 'stomachs'—known as the rumen or paunch (see d, figure 6, of plate at UNGULATA). This cavity presents the appearance in its lining membrane of a number of closely set villi, papillae, or small prominences. In the Camels the inner surface of the paunch is subdivided into a number of cells or pouches for the reception of water, these cells being generally arranged in two groups. The rumen of ordinary Ruminants communicates by an aperture of variable width with the second compartment of the stomach, known as the reticulum, or popularly as the honey-comb (c). This latter name has been applied to the cavity from the fact that its mucous or lining membrane is disposed to form folds or cells of hexagonal shape, which in a rough way resemble the disposition of the cells in a honey-comb. The third chamber is known as the psalterium (that is the psalm book) or manuphies (b), and receives its name from its lining membrane being arranged in longitudinal plates or folds (lamellae), inclosing clefts between them, somewhat resembling the leaves of a book. A narrow opening places the reticulum or second stomach in communication with the psalterium. The fourth compartment is named the abomasus or rennet (e). This division is of slender elongated form, and its mucous membrane, in addition to being of soft vascular character, is glandular in structure and secretes the gastric juice. Functionally regarded, therefore, and from this latter fact, the abomasus is to be considered the true digestive cavity of the Ruminant, in which solution of the food takes place.

The general morphology of this compound organ, and its relations to the single and simple stomach of other Mammalia, may be readily enough traced. The paunch and reticulum thus correspond to the cardiac, oesophageal, or anterior portion of the ordinary stomach, whilst the psalterium and abomasus together correspond to the pyloric, hinder, or intestinal extremity or half of the stomach. The oesophagus or gullet opens midway between the paunch and reticulum, and the edges of its opening are elevated into distinct muscular rugae or folds. These folds run in a parallel direction along the roof or upper border of the reticulum to the opening into the psalterium or third cavity, and when the edges of these folds are brought into apposition a canal is thus formed which places the gullet in direct communication with the psalterium, and thus cuts off the connection of the gullet with the reticulum.

In the process of feeding the grass and herbage is rapidly cropped off by the action of the lower incisors pressing against the hardened gum of the upper jaw. The food mixed with saliva is swallowed, and passes into the paunch, in which it appears to be simply moistened, but not materially altered in composition. The food next passes into the reticulum or second compartment. This latter division by some authorities has been regarded as possessing the function, in virtue of its honeycomb like structure, of moulding the food into pellets or small boluses, in which form it could be readily returned to the mouth for remastication. This view is denied by others, who maintain that a sudden sharp contraction of the diaphragm or midriff suffices to drive the contents of the rumen and reticulum against the aperture of the gullet, which dilates or opens, and receives a certain quantity of the sodden fodder. The aperture of the gullet now closes, and the mass of food contained within the

gullet is propelled upwards into the mouth. In this latter view, therefore, the bolus of food sent back to the mouth at each act is regulated and determined simply by the amount of fodder which the cardiac and dilated end of the gullet can contain, and not by any special moulding action of the cells of the manyplies.

The reversed action of the œsophageal muscles suffices for the return of the food to the mouth, such an action being imitated in essential detail in the act of vomiting. The return of the food may be observed by watching a Ruminant, the movement of the flanks and abdominal region, together with the movement of the throat, showing that substances are being propelled upwards into the mouth. Mastication of the food is now effected by a kind of rotatory motion, the lower jaw thus giving a first stroke, for example, from left to right, and the rotary motion continuing persistently afterwards from right to left, or in the opposite direction to the first movement of the jaws. In the Camels the motion of the jaws is said to be simply one from side to side.

After being thus thoroughly masticated and mixed with saliva, the food is once again swallowed. Meanwhile the liquid parts of the food may have passed directly to the psalterium from the reticulum, through the aperture already mentioned as existing between these cavities. But on the remasticated fodder being swallowed for the second time, it is directed (by the closure of the grooves or folds which exist at the opening of the gullet, along the upper border of the reticulum) at once into the psalterium or third chamber. The remasticated food thus passes directly into the third stomach, and not into the first, as before. At this stage the food has become finely divided, and the psalterium, through the disposition in folds of its lining membrane, is adapted for further straining off and reducing the food to a homogeneous condition suitable for true digestion and solution in the fourth stomach, to which it gradually passes from the psalterium. The latter chamber may doubtless of itself absorb the fluid parts of the food whilst transmitting the solids to the rennet.

Regarding the subsidiary and concomitant features of this interesting process, it may be noted that when the free action of the abdominal muscles is impeded or prevented, rumination cannot be performed, and the same result follows when the action of the diaphragm is interfered with. The punch and reticulum are never, even under starvation, thoroughly emptied of fodder by the process of rumination, in so far as the returning of the food to the mouth is concerned. Solids, when swallowed, may pass indifferently into the paunch or reticulum, and a mixture of the contents of these first and second cavities appears to be normally carried on through the peristaltic action of their walls. Fluids when swallowed appear to find their way into either the paunch, reticulum, psalterium, or fourth stomach. In the young or newly born Ruminant the first, second, and third compartments exist in an undeveloped condition, and food at first passes at once into the fourth chamber.

As in all vegetable feeders the alimentary canal of Ruminants is remarkable for its great relative length. In the Antelopes, Deer, and Camels the proportion between the length of the digestive tract and that of the body is regarded as 12 to 1, in the sheep it is as 28 to 1, and in oxen as 22 to 1. In a graffe Owen found the intestine alone to measure over 134 feet in length. *Concretions* consisting of masses of hair, plant tissues, &c., not unfrequently occur in the Ruminant paunch and reticulum, and the concretions known as *Bezoar stones* (see *BEZOAR*), and found in the stomachs, &c., of certain ruminants, are celebrated.

RUMINATION, the faculty possessed by some Mammals of 'chewing the cud'—that is, of returning the food to the mouth from the stomach for the purpose of being remasticated, prior to its undergoing the final changes incidental to digestion. The group of animals in which this power is most typically exemplified is that of the Ruminantia, but it appears highly probable that Mammals included in other and distinct divisions of the mammalian class may possess the faculty of rumination in a more or less perfect degree, for example, some Marsupials. See also **RUMINANTS**.

RUMP PARLIAMENT is the name by which the remains of the Long Parliament was known after the expulsion of the majority of its members by the army of Cromwell, December 6, 1648. It having been decided by a majority of the House of Commons that the concessions made by Charles I. in the Treaty of Newport were a ground of settlement, Oliver Cromwell, who wished for the condemnation of the king, despatched two regiments under the command of Colonel Pride to coerce the House. In discharge of the resolution of the army that 'none might be permitted to pass into the House but such as continued faithful to the public interests' Colonel Pride, whose regiment was stationed so as to block up all the entrances to the House of Commons, furnished himself with a list of the names of the members against whom the sentence of exclusion was passed, and as each approached prohibited him from entering. Forty-one members were placed under temporary restraint, and 160 ordered to their homes. Only sixty were admitted, all violent Independents, and these constituted the *rump* after the clearance wrought by *Pride's purge*, as it was called. This assembly, in conjunction with the army, brought about the arraignment, trial, and condemnation of Charles I. It was forcibly dissolved by Cromwell, April 20, 1653, for presuming to make a stand against certain demands of the army. Twice after this it was reinstated, but both times only for a brief period, and finally, on the 16th March, 1660, it solemnly decreed its own dissolution.

RUM SHRUB, a kind of concentrated cold punch, prepared with rum, orange and lemon juice, sugar, and water. The following is one of the many receipts favoured by the makers of this beverage. Rum, 1 gallon, orange and lemon juice, of each 1 pint, peels of two oranges and of one lemon, digest for twenty-four hours and strain, and add 4 lbs. of white sugar dissolved in 5 pints of water. In a fortnight decant the clear liquor for use. The substitution of a little brandy for a portion of the rum is regarded by some as an improvement.

RUNCIMAN, ALEXANDER, a painter of considerable note, was the son of a builder in Edinburgh, where he was born in the year 1736. Having shown in his earliest years a decided inclination for drawing he was placed at fourteen under the care of Messrs. John and Robert Norrie, house painters, the former of whom used to adorn the mantle pieces of the houses which he was employed to paint with landscapes of his own, which were then deemed respectable productions, and of which many a specimen is still preserved in the houses of the Old Town of Edinburgh. The youth devoted himself entirely to his art, and when the academy for rearing young artists was commenced at Glasgow by the brothers Poulis he became one of its pupils. He soon acquired considerable local fame for his landscapes, but failed entirely to make a living by them. Despairing of success in this branch of art he commenced historical painting, and in 1766 he visited Italy, where he met Fuseli, whose enthusiastic character matched aptly with his own. He spent five years in Rome assiduously studying and copying the

Italian masters, and in 1771 returned to his native country with powers considerably increased, while his taste, formerly over-luxuriant and wild, had experienced a corresponding improvement. Just at that time a vacancy had occurred in the mastership of a public institution called the Trustees' Academy, and the place, to which was attached a salary of £120, then a sufficient income in Scotland, was offered to and accepted by Runciman. Being thus secured in the means of subsistence he applied his vacant time to historical painting, and produced a considerable number of specimens, which were regarded with much favour, not only in his native country, but also in England, where several of them were exhibited. Among his best known productions may be mentioned Macbeth and Banquo, in a landscape, a Friar, in a landscape, Job in Distress, Samson Strangling the Lion, Figure of Hope, St Margaret Landing in Scotland, and her Marriage to Malcolm Canmore, in Dunfermline Abbey, Christ Talking to the Woman of Samaria, Agrippina Landing with the Ashes of Germanicus, the Princess Nausicaa Surprised by Ulysses, Andromeda, Sigismunda Weeping over the Heart of Tancred, the Ascension, painted on the ceiling over the altar of the Episcopal chapel in the Cowgate, Edinburgh, the Prodigal Son (for which Fergusson the poet was the study), and the paintings in Ossian's Hall at Penicuik, executed at the request of Sir J. Clerk, in whom he found a generous patron. The work last mentioned was the *chef d'œuvre* of Runciman. The principal scenes are twelve in number, referring to the most striking passages in Ossian's Poems. The task was one of no small magnitude, but the painter dreamed of rivaling the famed Sistine chapel, and laboured at his work with only too much enthusiasm. In consequence of having to paint so much in a recumbent posture, and perhaps denying himself the exercise which the bodily frictions demands, he contracted a malady which carried him slowly to the grave. He died October 21, 1785, dropping down suddenly on the street when about to enter his lodgings. Runciman was remarkable for candour and simplicity of manners, and possessed a happy talent for conversation. Among his associates were Robertson, Hume, Lord Karnes, and Lord Monboddo.

RUNCORN, a sea port town of England, in Cheshire, on the left bank of the Mersey, 12 miles E S E of Liverpool. It has a town hall and public hall, in addition to the usual churches and schools. The London and North Western Railway to Liverpool here crosses the Mersey by a magnificent lattice bridge. The town has several boat building yards, roperies, tanneries, besides soap, chemical, and other works. It has spacious docks, communicating with the Mersey by a gateway 50 feet in width, and furnished with all the modern appliances for the loading and unloading of ships. It has also a custom house, and every requisite for an extensive and rapidly increasing trade. Runcorn is on the new Manchester Canal (which see), and its docks are connected with it, thus giving it an improved access for large vessels. Excellent stone is obtained from quarries here. Pop in 1881, 15,133, in 1891, 20,050, in 1901, 16,491.

RUNIC ALPHABET This alphabet, peculiar to the ancient northern tribes of Europe (Germans and Scandinavians), is considered by some scholars to have existed before the Christian era, by others to have originated later. The similarity of a few Runic characters to corresponding Roman ones proves nothing, as it prevails with but a few of them, moreover, the Runic alphabet has but sixteen characters, and this limited number is hardly reconcilable with the idea of the Scandinavians having borrowed it from the Romans. Frederick von Schlegel advances the

hypothesis that the Phœnicians, navigating in early antiquity to the coasts of the Baltic, might have carried the art of writing to those northern regions, and that the Runic grew out of the Phœnician characters, and was preserved by the priests, and employed by them for the purposes of magic. The similarity of a few of the Runic signs to those of the Romans might be explained by the fact that the Romans themselves received their characters from an eastern source. The fact that in Spain and other countries in the south west of Europe remains of the Runic and Runic stones (tomb-stones, landmarks, &c.) are met with is to be explained from the influx of the tribes of ancient Germany and Scandinavia into those countries at the time of the general migration of nations. W. C. Grimm, in his *Ueber Deutsche Runen* (Göttingen, 1821), endeavours to show that the Germans had probably in ante-historic times characters of more than accidental similarity to those of the Greek and other alphabets, and that the German Runic, properly so called (that of the Saxons of the Northern Elbe), is between the ancient northern (Scandinavian) Runic and the Anglo-Saxon, so that the German Runic originated from the former and produced the latter. The word *rune* he derives, as Mone does, from *runen* (that is, to make a slight incision or scratch). According to Dahlmann and Kopp the northern runes are of later origin than is generally supposed. The Runic *codices* are proved to be of less antiquity than some written in common characters. Langebeck found in 1753 that none of the numerous Runic writings in Gothland reached back farther than the year 1200 of our era, the latest were of the year 1419. The Runic letters and inscriptions are usually divided into three classes—the Scandinavian or Norse, the German, and the Anglo-Saxon. The Norse Runic alphabet, the oldest of these, consisted of sixteen characters, as follows—

Fe	Ur	Thurs	Os	Reid	Kann	Hagl	Naud
ƿ	h	þ	ʀ	ʁ	ʏ	ʒ	ʁ
f	u	th	o	r	k	li	n
Is	Ar	Sol	Tyr	Börk	Laugr	Madr	Yr
l	ʌ	h	↑	þ	l	ʏ	ʁ
i	a	s	t	b	l	m	y

From this it will be seen that there were no letters corresponding to our *d*, *c*, *q*, *p*, *g*, *v*, *x*, *z*. Hence the sign of *k* served also for *g*, *t* for *d*, *b* for *p*, and *u* and *q* for *i*, *o* was expressed by *au*, and *e* by *i*, *a*, *ia*, or *ai*. A few additional letters were afterwards added to make up for the deficiencies of the alphabet, but it found a fuller development among the Germans and Anglo-Saxons, the latter of whom extended the alphabet to embrace forty characters. As the Runic characters were intimately associated with the practice of magic arts this accounts for their proscription by the early Christian Church, though evidence has been found to show that the Christians in England at least used them for inscriptions. See Stephen's Handbook of Runic Monuments (1881), Old Northern Runic Monuments (three vols 1866–68–84), of which the preceding is an epitome, and The Runes Whence Come They? (1894), Isaac Taylor's Greeks and Goths: a Study on the Runes (1879), and The Alphabet (1883), Wimmer's Die Runenschrift (1887), &c. —*Runic wands* were willow wands inscribed with mysterious characters, and used by the heathen tribes of the north of Europe in the performance of magic ceremonies.

RUNJEET SINGH, King of Lahore, was born at Gugarānwāla, 60 miles west of Lahore, November 2, 1780. His grandfather, Churruth Singh, had

from a humble sphere raised himself by his daring exploits to be the *sirdar* or chief of Sookur Chukea, in the Punjab, while his father, Maha Singh, considerably extended the territory bequeathed him. When twelve years of age Runjeet lost his father, and the government was intrusted during his minority to his mother. This woman was still young and handsome, and given to a rather irregular mode of life. Her ambition, coupled no doubt with the instigations of her paramour, Lukput Singh, led her to seek to supplant her son, to which end she used all the methods she could to corrupt him, and so incapacitate him from the discharge of his duties as his father's successor. She in part succeeded with her scheme of corrupting his mind, but it had not the anticipated result, for at the age of seventeen he assumed the absolute control of affairs himself, and his mother dying suddenly about the same time, it was rumoured that he had poisoned her. His career of ambition now commenced. In 1799, having rendered important services to the Shah of Afghanistan in his invasion of the Punjab, that prince granted him the possession of Lahore, which he had taken from the Sikh sirdars. The northern provinces of India were at that time in the hands of a multitude of petty independent princes. Against these Runjeet Singh turned his arms, and each year saw one or more of them, either by force or by policy, subjugated to his rising power. He thus greatly extended his sway, and by the year 1809 had succeeded in forming a considerable state. These ceaseless conquests alarmed the Sikh chiefs established between the Satlej and the Jumna, and they had recourse to the English for protection. The governor general sent an envoy to Lahore, and matters were amicably arranged. The Runjeet was to abandon all pretensions to feudal authority over the Sikhs in question, while the British government renounced all claims to the territories of Runjeet situated to the north of the Satlej. This was the only occasion on which Runjeet came into hostile contact with the British. So struck was he with the discipline and bravery of the troops that escorted the envoy, that from that time he made strenuous efforts to organize his army after the European model, in which he was greatly assisted by the foreign officers he induced to enter his service. In 1812 he succeeded in organizing the whole of the Punjab into one sovereignty, and proclaimed himself rajah. About this time two dispossessed rulers of Afghanistan sought his assistance, and as one of them was possessed of the celebrated Koh-i-nûr, now the property of the English crown, Runjeet, who coveted this diamond, made it the price of his assistance. Having to his other conquests added that of the important town of Multan in 1817, and of the rich city of Cashmere in 1819, he then assumed the title of *maharajah*, or king of kings. In 1822 he received into his army two French officers, Allard and Ventura, who had served under Napoleon, and by their aid he was enabled to complete the reconstruction of his army. He now sought to extend his dominion to the west of the Indus, and in 1829 succeeded in taking from the Afghans the province of Peshawur. Some years before his death his army consisted of 66,000 men, of whom 36,000 were infantry organized into regular regiments. His kingdom extended from the Satlej to the Indus, and from Cashmere to Multan, a district which comprised a population of about 20,000,000, and yielded a considerable revenue. Though the maharajah and the British regarded each other with feelings of mutual jealousy, the amicable relations subsisting between them were never ruptured. In 1836 his army was totally defeated by the Afghans, but in spite of these reverses he preserved his authority over his subjects

to the last. He died June 27, 1839, his health having been undermined by the excesses in which he frequently indulged. He was totally uneducated, being unable even to read or write, but the energy of his administration and his moderation are without parallel in the history of eastern despots.

RUNNING See LOCOMOTION (ANIMAL)

RUNNYMEDE, in England, the celebrated meadow where the conference was held, June 15, 1215, between John and the English barons, in which the former was compelled to sign Magna Charta and the Charta de Foresta. (See JOHN) It is 5 miles east of Windsor, in Surrey, lying along the right bank of the Thames, and is now divided into several inclosures.

RUPEE is the name of a silver coin current in India. The sterling value of this coin is nominally 2s., but owing to the depreciation of silver it has of late years varied between 1s. 11d. and 1s. 3d. A rupee equals 16 annas, $\frac{1}{2}$, $\frac{1}{4}$, and $\frac{1}{8}$ rupee are also coined in silver. A *lac* of rupees is 100,000, and a *crore* 10,000,000 rupees.

RUPERT, or ROBERT of BAVARIA, PRINCE, the third son of Frederick V., elector palatine and titular king of Bohemia, by the Princess Elizabeth of England, daughter of James I., was born in 1619, and becoming an exile through the misfortunes of his father, at the commencement of the civil war in England, he offered his services to his uncle, Charles I., and had the command of a corps of cavalry, at the head of which he distinguished himself at the battle of Edgehill in 1642, and at Chalgrove Field in Oxfordshire in 1643. Soon after he took Bristol, and obliged the enemy to raise the sieges of Newark and of York. He displayed his courage at Marston Moor and at Naseby, but his impetuosity and imprudence contributed to the disastrous result of those engagements. He afterwards shut himself up in Bristol, but having surrendered that place after a short siege to Fairfax, his conduct so much displeased the king that he dismissed the prince from his service. In 1648, however, he was restored to favour, and was made commander of that part of the fleet which still adhered to Charles. Prince Rupert for some time carried on a predatory warfare against the English, but in an engagement with Blake, off the Spanish coast, he was worsted, and his whole squadron destroyed, with the exception of four or five ships, with which he escaped to the West Indies, where he supported himself by capturing English and Spanish merchantmen. He contrived at length to make his way to France, and joined Charles II. at the court of Versailles. His time was chiefly devoted to scientific studies till the Restoration, when he returned to England. In 1666 he was appointed, in conjunction with Monk, to the command of a fleet against the Dutch, and in the next war with Holland in 1673 was made admiral of the fleet. In 1679 he was nominated a member of the new privy council, but from that period he interfered but little in public affairs, leading a retired life, and spending much of his time at Windsor Castle, of which he was governor. Many useful inventions resulted from his studies, among which are the invention of prince's metal, and although the discovery of the method of engraving in mezzotinto is not due to him, as has been erroneously supposed, he introduced the art into England. He also introduced the curious glass drops that have been named after him, Prince Rupert's drops. (See PRINCE RUPERT'S DROPS) He was likewise one of the founders and the first governor of the Hudson's Bay Company, incorporated in 1670. The prince died in London, November 29, 1682.

RUPERT'S LAND is the name of an extensive territory in British America, conferred by Charles I.

on Prince Rupert, and transferred to the Hudson's Bay Company, of which that prince was one of the founders, by Charles II in 1670. The name seems to have been rather vaguely used, but the territory may be described as having extended from the Rocky Mountains on the west to Labrador on the east, north to Lake Athabasca, and south to the United States boundary. Since the province of Manitoba has been formed, and the districts of Saskatchewan, Assiniboia, Alberta, Kewatin, &c., organized, the name has practically dropped out of use, though it still gives the title to a bishopric, the Bishop of Rupert's Land residing at Winnipeg. This region, in common with the other parts of the Hudson's Bay Territories, was comprehended on its amalgamation with the Dominion of Canada in 1870 under the general designation of the North west Territories. See NORTH WEST TERRITORIES.

RUPIA, a skin disease, consisting of an eruption of small flattened and distinct bullæ surrounded by inflamed areolæ, containing a serous, purulent, sanious, or dark bloody fluid, and followed by thick, dark-coloured scabs over unhealthy ulcers. Three varieties of this disease are described, *Rupia simplex*, *R. prominens*, and *R. escharotica*. *Rupia simplex* commonly appears on the legs, sometimes on the loins or thighs, and seldom on other parts. The bullæ are not preceded by any inflammatory symptoms, vary from $\frac{1}{2}$ inch to 1 inch in diameter, and contain at first a transparent serous fluid, which soon becomes turbid and purulent, and dries into scabs. The scabs are easily removed, displaying an ulcerated surface underneath, and several series of these scabs may follow before healing sets in. In *Rupia prominens* the bullæ are larger, the scabs thicker, and the ulceration deeper than in the preceding. The scab, which in shape sometimes resembles a lampet, adheres firmly, and generally requires emollient applications to facilitate its removal. *Rupia escharotica* occurs chiefly in cachectic children and infants. It is commonly confined to the lower extremities, and begins by one or two red and livid spots, over which the cuticle is soon raised by the effusion underneath it of a serous fluid. The bullæ thus formed increase, the serum they contain becomes turbid, and of a blackish hue. A bloody and offensive sanies marks the surface of the sore, the edges of which are livid, but not very painful. *Rupia* is a chronic disease, it is not dangerous, but is often very obstinate and tedious. It is not contagious, and generally attacks persons debilitated by old age, intemperance, bad living, or previous diseases, especially small-pox, scarlatina, and syphilis. The general treatment consists mainly in the administration of tonic decoctions, more especially those of cinchona, cascarilla, gentian &c., with alkalies, a generous and nutritious diet, warm salt water and alkaline baths, &c. The local treatment consists chiefly of puncturing the bullæ early, and allowing the morbid secretion to escape, of poulticing in order to remove the scabs, and of applying lotions containing nitrate of silver or nitric acid, or any other slightly stimulating application.

RUPPELMONDE, a town in Belgium, in the province of East Flanders, 25 miles east by north of Ghent, near the confluence of the Ruppel with the Scheldt. Its ancient castle, which was erected by the counts of Flanders, and figures much in Flemish history, has been completely modernized. The port, though small, is commodious, and has a considerable trade. Gerard Mercator, the navigator, and author of the well-known projection of maps, was born here. Pop. 2809.

RUPPIN, Neu, a town in Prussia, in the province of Brandenburg, on the west shore of the lake of the same name. It is walled and well built, and has a

church, gymnasium, lunatic asylum, and two hospitals, manufactures of woollens, luns, chicory, and tobacco, several breweries and distilleries. The architect Schinkel was born here. Pop. (1896), 15,527.

RUPTURE. See HERNIA.

RURAL DEAN, an ancient official of the English church, whose office is of a temporary character, being exercised under an archdeacon, on the appointment of a bishop, and held only during the lifetime of the person conferring it. The rural deans (who are parish clergy) exercise a certain supervision over morals and churches within the district (consisting of so many parishes) allotted to their charge, and altogether they number more than eight hundred, the rural deaneries being of the same number. In former times, among other duties they acted as penitentiaries to receive the confessions of priests.

RURIK, the founder of the Russian monarchy, flourished in the ninth century. Most writers consider him to have been a Varangian, of Scandinavian origin, though Kostomorof has endeavoured to prove that he was a Lithuanian. But whatever his nativity, it is undisputed that he came to Russia about 862, accompanied by his brothers Sinaf and Truvor, in compliance with the request of the Slaves of Novgorod, then a divided republic. One of the brothers established himself at Belozersk, the other at Izhorsk, while Rurik began by fortifying himself in the ancient town of Ladoga, which is at the present day a miserable village on the Volkof. The Novgorodians having soon, however, repented of having set a master over themselves, rose in rebellion against Rurik, and at their head was one of their fellow citizens named Vadim, whose valour is celebrated in the ancient chronicles, and likewise in Russian song. Rurik succeeded in establishing a dictatorship in Novgorod in 865, and is said to have killed Vadim with his own hand. His possessions were soon afterwards greatly enlarged by the death of his brothers, whose principalities, since they died without issue, Rurik united to Novgorod. In order to secure himself and his descendants in their newly acquired territory, he invited various colonies of Varangians, on whose devotion he could count, to settle in the country. Rurik died peaceably in 879, after a reign of seventeen years. The family of Rurik reigned in Russia till the death in 1598 of Feodor, son of Ivan the Terrible, when it was succeeded by the closely allied house of Romanoff.

RUSA, a genus of Cervidæ or Deer, represented by such forms as the Sambur or Samboe of Asia (*Rusa Aristotichs*) and the Great Rusa Deer (*R. hypelaphus*) of the Eastern Archipelago, the Axis Deer (*Axis maculata*) or Spotted Hog deer of Ceylon and India being closely allied. The genera Rusa and Axis are the chief divisions of the Rusine sub tribe, which latter group is distinguished by the horns possessing an anterior basal snag, by the muffle not being separate or distinct from the muzzle, and in its being set high, and by the hair tufts borne on the hind legs, as in the Elaphine sub tribe.

The Sambur Deer is a large animal, exceeding the Red Deer in size. Its horns are set on a prominent basal piece or foot stalk, the snag is given off at its crown, and the tips are forked. The colour is sooty brown, the feet, eyebrows, and root of the tail being of a tan colour. The males possess prominent manes. These deer inhabit low-lying pastures, and swim well. They are vicious and bold in character.

The Axis Deer possesses horns like those of the Sambur, set on stalks, the snag projecting forwards near the base, and the tips being deeply but simply forked. The colour is a golden brown, a black stripe runs along the spine, and the sides are spotted with

white in two series or rows of spots arranged in obliquely curved lines. A white streak runs across the haunches. In size the Axis equals the Fallow Deer. It is chiefly of nocturnal habits, and frequents the grass jungles.

RUSH, the term applied to the different species of *Juncus*, belonging to the natural order Juncaceæ (which see), which includes also the wood rush (*Luzula*) and the bog asphodel (*Narthecium*). The rushes have a glumaceous perianth of six sepals, glabrous filaments, three stigmas, and a three celled many seeded capsule. The leaves are rigid, mostly roundish, and smooth. There are about twenty species noted in the British flora. The rushes may be divided into two classes or tribes—the rushes proper or leafless rushes, and the bog sprouts or bristle leaved rushes. The rushes are very innutritious, and are seldom eaten by live stock except in cases of necessity. Hence rushes are of little agricultural importance. The most common of the leafless rushes are the common or globular panicled rush (*J. conglomeratus*), the loose panicled rush (*J. effusus*), and the glaucous or light green rush (*J. glaucus*). The rushes are natives chiefly of cold and temperate regions. Some of them have been used as anthelmintics and diuretics, the cellular tissue at the base of the leaves is sometimes eaten. The leaves are often employed to form matting and the bottoms of chairs, and the pith for the wicks of candles or lamps.

RUSH, BENJAMIN, M.D., was born on the 24th December, 1745 (old style), near Philadelphia. In 1766 he went to Edinburgh to study at the university in that city, and took his degree of M.D. there in 1768. After spending a winter in London, and making a visit also to France, he returned to Philadelphia, and was soon after elected professor of chemistry in the College of Philadelphia (1769). He early identified himself with the patriotic party, and was one of the signers of the Declaration of Independence. In 1777 he was appointed physician general of the military hospital in the middle department, some time after which he published his observations on hospitals, army diseases, and the effects of the revolution on the army and people. About 1785 he planned the Philadelphia dispensary, the first institution of the kind in the United States. In 1787 he was a member of the convention of Pennsylvania for the adoption of the federal constitution, which received his warmest approbation. Shortly afterwards he took leave of political life, and in 1789 he was made professor of the theory and practice of medicine in the Philadelphia Medical College, and when in 1791 the college was merged in the University of Pennsylvania, he was appointed professor of the institutes and practice of medicine, and of clinical practice. In the previous year he had begun to publish his new principles of medicine, depending chiefly for the cure of diseases upon bleeding and cathartics, and these were more or less developed by him in his successive annual courses of lectures for the subsequent twenty-three years of his life. In 1793, when Philadelphia was desolated by the yellow fever, Dr. Rush adopted with great success a mode of treatment of his own. He died April 19, 1813. He was a voluminous and versatile writer. His medical works, the most important of which are *Medical Inquiries and Observations, Diseases of the Mind, and Medical Tracts*, procured him honours from several European sovereigns.

RUSSELL, HOUSE OF, a great English historical family, said to have derived its descent from Turstain, a Scandinavian jarl who settled in Normandy after its conquest by the Northmen, and became possessed of the Castle of Rozel, near Caen. The name of HUGH DE ROZEL appears in a charter of Matilda, the wife of William the Conqueror, dated 1066, and

is also, together with that of his elder brother, on the roll of Battle Abbey. They both accompanied Robert of Normandy in the first crusade. The elder died there, but Hugh returned and settled in England. A descendant of his, JOHN ROZEL or RUSSELL, as the name had now begun to be written, was Constable of Corfe Castle about 1221, and another descendant, WILLIAM RUSSELL, represented Southampton in the first Parliament of Edward II. SIR JOHN RUSSELL, a direct descendant of the last named, was speaker of the House of Commons in Henry VI's reign. A grandson of Sir John's was in favour with Henry VIII. The lands of the Abbey at Tavistock, and of the dissolved monastery at Woburn, were conferred on him, and he was made Earl of Bedford. His son, the second earl, died without leaving any issue, and the title passed into another branch of the Russell family. WILLIAM RUSSELL, the fifth earl, father of the famous Lord William Russell (see below), was created Marquis of Tavistock and Duke of Bedford in 1694. JOHN, fourth duke (1710–71), held office in the Newcastle and Grenville ministries, and was lord lieutenant of Ireland in 1756–62. FRANCIS, fifth duke (1765–1802), was distinguished for his services to agriculture. FRANCIS, seventh duke (1788–1861), eldest brother of John, Earl Russell (see below), was summoned to the House of Lords in 1832, before the death of his father. He held no political office, but like most members of the family gave staunch support to the Whigs. The ninth duke, FRANCIS, was succeeded by his son GEORGE, the tenth duke, in 1891, and he by his brother Herbrand in 1893. A notable member of the family was Admiral EDWARD RUSSELL, who distinguished himself by his victory over the French fleet at La Hogue, in 1692.

RUSSELL, JOHN, EARL, an eminent English statesman, third son of John, sixth Duke of Bedford, was born in London 18th August, 1792. He was for a short time at Westminster School, but mostly received his early education privately, being afterwards sent to Edinburgh University, where he studied with zeal and success under Playfair and Dugald Stewart, and trained himself to debate at the meetings of the Speculative Society. In July, 1813, he entered Parliament, and soon gained a good position among the politicians of the day. He early took up the subject of parliamentary reform, and also advocated the repeal of the Test and Corporation Acts, and Roman Catholic emancipation. In 1828 he had the satisfaction of seeing the Test and Corporation Acts repealed by the Wellington ministry, which acceded to power in 1828, and in April, 1829, the Catholic Relief Bill became law. When the Grey cabinet was formed in 1830 Lord John Russell, who was paymaster general of the forces, was elected one of a committee of five to formulate a reform bill. It was brought before the House of Commons on the 1st of March, 1831, by Lord John Russell, and though he defended it clause by clause with extraordinary vigour, it was ultimately rejected. Upon this the Whig ministry resigned, and an appeal was made to the country. The elections resulted in a majority favourable to the bill, which received the royal sanction on the 7th June, 1832. In Lord Melbourne's second cabinet (1835–41) he was at first home secretary and then colonial secretary, and on the outbreak of the Canadian rebellion, by recognizing the right of the colonists to self government, he reconciled them completely to the mother country. From 1841 (in which year he became member for the city of London) to 1845, during the Peel administration, Lord John Russell led the opposition, but lent his influence in favour of the repeal of the corn laws. In 1846 he succeeded to the premiership, which he held till 1852, his majority in Parlia-

ment, however, being small and uncertain. He was able to pass his Ecclesiastical Titles Bill of 1851, prohibiting the assumption of territorial titles by Roman Catholic bishops, but found himself, in 1852, compelled to resign the seals of office into the hands of Lord Derby. Under the succeeding administration of Lord Aberdeen Russell was foreign secretary for a short time. He also filled the post of lord president of the council from June, 1854, to February, 1855. In the latter capacity, in 1854, he introduced a Reform Bill, which proposed to swamp the smaller boroughs by uniting to them other adjacent districts for electoral purposes. This measure he was reluctantly compelled to withdraw on account of the war with Russia. He was colonial secretary under Lord Palmerston in 1855, and represented Great Britain at the Vienna conferences, but by his mode of conducting the negotiations he incurred so much unpopularity that he found it prudent to resign his office (July, 1855). When Palmerston returned to power in 1859 Lord John again became foreign secretary, with a seat in the cabinet. He took a leading part in regard to several political questions which now arose—among others, the oppression of the Poles by Russia, the aggressive policy of the German powers towards Denmark, and the disputes between Britain and the United States as to the neutrality observed during the continuance of the civil war. He retained his seat for the city of London from June, 1841, till July 30, 1861, when he was raised to the peerage as Earl Russell. After the death of Lord Palmerston, October 18, 1865, Earl Russell became prime minister for the second time, Mr Gladstone taking the lead in the House of Commons. During the session of 1866, in conjunction with Mr Gladstone, he introduced a new Reform Bill, which failing to pass the ministry resigned, and was succeeded by that of Lord Derby. Thenceforth Earl Russell held no office in any ministry, though he always took an active part in promoting Liberal measures. He died 28th May, 1878. From an early age to near the close of his life he indulged in literary pursuits, and published among other works *History of the British Constitution* (1821), *Essay on the History of the English Government* (1823), *Memoirs of the Affairs of Europe* (1824-29), *Essay on the Causes of the French Revolution* (1832), *Memoirs and Correspondence of Thomas Moore* (1852-56), *Selections from the Correspondence of John, Fourth Duke of Bedford* (1853-54), *The Life and Times of Charles Fox* (three vols 1859-66), *Selections from Speeches of Earl Russell, 1859 to 1865*, *Recollections and Suggestions, 1813-73*, published in 1875.

RUSSELL, LORD WILLIAM, third son of the fifth earl, English statesman and political martyr, was born in 1639. He gave himself up to the prevalent dissipation of the age until his marriage with Rachel, daughter of the Earl of Southampton (then widow of Lord Vaughan), which wholly reclaimed him. He represented the county of Bedford in four Parliaments, and being highly esteemed for patriotism and independence was regarded as one of the heads of the Whig party. In 1679, when Charles II found it necessary to ingratiate himself with the Whigs, Lord Russell was appointed one of the members of the privy council. He soon, however, found that his party was not in the king's confidence, and the recall of the Duke of York, without their concurrence, induced him to resign. Although his temper was mild and moderate, his fear of a Catholic succession induced him to take decisive steps in the attempt to exclude the Duke of York. In June, 1680, he went publicly to Westminster Hall, and at the Court of King's Bench presented the duke as a recusant, and

on the November following carried up the exclusion bill to the House of Lords, at the head of 200 members of Parliament. The king dissolved the Parliament, and determined thenceforward to govern without one, and arbitrary principles were openly avowed by the partisans of the court. Alarmed at this state of things, many of the Whig leaders favoured strong expedients in the way of counteraction, and some method of coercing the king seems to have been debated. Among the leaders of the movement, including the Dukes of Monmouth and Argyll, the Lords Russell, Essex and Howard, Algernon Sidney and Hampden, different views prevailed, but Lord Russell looked only to the exclusion of the Duke of York. Meanwhile a plot was laid by some inferior conspirators for assassinating the king on his return from Newmarket, at a farm called the Rye-house, which gave a name to the conspiracy. Although this plan was not connected with the other scheme, the detection of the one led to that of the other, and Lord Russell was, in consequence, committed to the Tower. After some of the Rye-house conspirators had been executed he was brought to trial, in July, 1683, and on insufficient evidence, and after very little deliberation, brought in guilty of high treason. Once condemned such a victim was too obnoxious to the court, and to the vindictive feelings of the Duke of York, to meet with mercy, and the offer of a large sum of money from his father, whose only son he had now become, to the royal favourite, the Duchess of Portsmouth, and the pathetic solicitations of his wife, proved in vain. He was too firm to be induced by the divines who attended him to subscribe to the doctrine of non resistance, then the favourite court tenet of the day, but he was induced to write a petitionary letter to the Duke of York, promising to forbear all future opposition, and to live abroad, should his life be spared. This he could not obtain, however, and when he had taken the last farewell of his wife he was beheaded in Lincoln's Inn Fields, July 21, 1683, in the forty second year of his age. To the character of this regretted nobleman for probity, sincerity, and private worth even the enemies to his public principles have borne ample testimony. Of his talents, Burnet observes that he was of a slow but sound understanding. His life has been written by Lord John Russell — LADY RACHEL RUSSELL, his wife, by the affectionate zeal with which she assisted her husband, acting as his amanuensis at his trial, and the magnanimity with which she bore his loss, obtained the respect and admiration of the world. She spent the remainder of her life in the exercise of pious and social duties. A collection of her letters was published in 1775. She died in 1728, aged eighty seven.

RUSSIA, the most extensive empire in the world next to the British, is bounded north by the Arctic Ocean, west by Sweden, the Baltic Sea, Prussia, Austria, and Roumania, south by Roumania, the Black Sea, Turkey in Asia, Persia, Afghanistan, the Chinese Empire, and the Pacific, and east by Behring's Strait. It thus comprises the whole of Eastern Europe, and stretches continuously over the whole continent of Asia to Behring's Strait, after having passed over nearly half the circuit of the globe, or about 172 degrees in all. The length, east to west, is estimated at less than 7000 miles. The average breadth, north to south, probably does not exceed 1500 miles. So immense, indeed, is the whole area, that it is at least twice that of Europe, containing about 8,675,892 square miles. Of these, the proportions belonging to Europe and Asia, and their respective populations, are exhibited in the following table. The population figures are mostly those of the census of 1897.

Area and Population of the Russian Empire

GOVERNMENTS OF EUROPEAN RUSSIA	Area, in English square miles	Pop. in 1897
Archangel	331 547	346,536
Astrakhan	91 801	1,003 542
Hessarabia	17 614	1 933,496
Chernigov	20,227	2 321,900
Don Cossacks	63,538	2,575 818
Ekaterinoslav	24,470	2,112,651
Esthonia	7 816	413 724
Grodno	14,926	1,617 859
Kaluga	11 939	1,185 726
Kazan	24 594	2,191,058
Kharkov	21,035	2 500 811
Kherson	27 516	2 732 832
Kiev	19,686	3 576 125
Kostroma	32,482	1,429 228
Kovno	15 087	1 549 414
Kurland	10,532	672 634
Kursk	17,912	2,396,577
Livonia	18 154	1,300,610
Minsk	95 283	2 156,123
Mohilev	18 546	1,708 041
Moscow	12 855	2,431 350
Nijni Novgorod	10 792	1,600,304
Novgorod	47 223	1,392 933
Olonez	57 454	361,156
Orel	18 017	2 054 719
Orenburg	73 795	1 609,388
Penza	14,993	1,491,215
Perm	128 176	3,003 208
Podolsk	16,219	3 031 513
Poltava	19 260	2,794 727
Pskov	17 065	1 136 540
Riazan	16 249	1,827 539
St. Petersburg	20,754	2 107 691
Samara	58,304	2 763 478
Saratov	32 615	2 419 884
Simbirsk	19 105	1,549,461
Smolensk	21 633	1 551 068
Tambov	25 703	2 715,453
Taurida	24,491	1,443 566
Tula	11,951	1 432,743
Tver	25,218	1,812 825
Ufa	47 090	2 220 497
Viatka	59 312	3 082 798
Vilna	16 417	1,591 207
Vladimir	17 434	1,489 246
Vladimir	18 859	1,570 733
Volhynia	27 735	2 997 902
Vologda	155 455	1,365,587
Voronej	25 435	2,546 255
Yaroslavl	13 747	1,072 478
	1,887,178	94 206 195
GOVERNMENTS OF POLAND		
Kalisz	4 300	846 719
Kielce	3 896	763 746
Lomza	4 077	585 781
Lublin	6 499	1 159 463
Protikow	4 728	1 409 044
Plock	3,646	556 877
Radom	4 768	820 363
Siedlce	5 533	775 316
Suwalki	4,845	604 945
Warsaw	6,763	1,933,689
	49,115	9,455 943
GOVERNMENTS OF THE GRAND DUCHY OF FINLAND		
		1889
Åbo Bjorneborg	9 310	440 174
Kuopio	16 494	311,539
Nyland	4 583	289 026
St. Michel	8 817	188 548
Tavastehus	8 332	295 533
Uleåborg	93 939	277 628
Vasa	16 101	457,154
Viborg	16 620	413,598
	144 214	2,673 200
Sea of Azov	14 516	—
Total of Russia in Europe	2,095 053	106,335,338
Caucasia	182 405	9 251 945
Siberia	4,832 136	5,731 552
Central Asia	1 370 805	7,721,684
Lake Aral	96 159	—
Caspian Sea	169 384	—
Total of Russian Empire	8,675,892	129,040,519

Various classifications, partly historical and partly geographical, of these numerous divisions are given Archangel, Olonez, Vologda, Kaluga, Kostroma,

Kursk, Moscow, Nijni Novgorod, Novgorod, Orel, Petersburg, Pskov, Riazan, Smolensk, Tambov, Tula, Tver, Vladimir, and Yaroslavl form Great Russia, Kurland, Esthonia, and Livonia are the Baltic Provinces, Minsk, Mohilev, and Vitebsk constitute White Russia, Grodno, Kovno, and Vilna, Lithuania, Chernigov, Don Cossacks, Kharkov, Kiev, Podolia, Poltava, Volhynia, and Voronej, Little Russia.

The continuity of the empire might seem to suggest the propriety of viewing it as one great whole, and of proceeding accordingly to give a detailed description of it in a single article, but its immense magnitude, and the distinct names commonly used to designate the different portions, make it more convenient to consider them separately under the heads of European Russia, Siberia, and Caucasian Russia. The last two will be found under the articles CAUCASUS and SIBERIA.

EUROPEAN RUSSIA has the same boundaries on the north and west as those given above for the empire. Its southern boundaries also are the same as far east as the eastern shores of the Black Sea, and beyond this the Mountains of the Caucasus. The eastern boundary is not so well defined. In its northern part the Ural Mountains form such a definite natural barrier that their title to fix the frontiers of Europe and Asia, so far at least as the governments Archangel and Vologda extend, has been almost universally recognized. To the south of this the boundary may be said to be almost arbitrary. Some continue to follow the Ural chain southwards till it reaches the sources of the river Ural and then follow the course of this river to its mouth in the Caspian. Others, in forming the boundary, quit the Ural chain much earlier, and, commencing at the sources of the Vishera, follow it downwards to its junction with the Kama, then follow the Kama to its junction with the Volga, and finally follow the Volga to its mouth. We shall here take the former boundary, premising, however, that parts of the governments of Perm and Orenburg extend across the Ural Mountains, and are therefore in Asia. European Russia, as thus defined, is bounded north east by the Ural Mountains, east by the government of Tobolsk, the steppes of the Kirghiz, and the Caspian Sea.

The surface, in the most general view that can be taken of it, is two immense plains, the boundary between which is marked, though not very definitely, by a broad central ridge which stretches across it in an irregular waving line, mainly in a north east direction commencing on the frontiers of Poland, and terminating on the west side of the Ural Mountains, near lat 62° N. This ridge forms the eastern continuation of the great watershed which divides the whole continent of Europe into a north and a south basin, but, unlike the west part, which is composed of lofty mountain chains or elevated plateaux, is only of very moderate height, never exceeding 1000 feet above sea level. Even this height is attained only in the Valdai Hills, the far greater part of which, and of the remainder of the ridge, has an average height of not more than 500 feet. The only regions where the surface assumes a mountainous appearance are in the east, where the Ural chain, though nowhere much exceeding 5000 feet, looks more elevated, at least in its northern part, from its high latitude and consequent covering of perpetual snow, and in the south, where the Mountains of the Yaila chain, lining the southern shores of the Crimea, have a height of about 4000 feet. With these exceptions the only other parts of European Russia which, according to the limits above assigned to it, do not belong to its two immense plains, are those districts of Perm and Orenburg which are situated on the

east side of the Urala, and slope towards the almost boundless steppes of Asia.

Rivers and Lakes—The broad central ridge above referred to, forming the great water shed of the country, sends the waters on the north side of it either to the Arctic Ocean or to the Baltic, and those on the south side of it to the Black Sea or to the Caspian. These, therefore, form the four great basins to which all the rivers of European Russia belong. These rivers are remarkable both for their number and their magnitude, and in order to avoid confusion in describing them it will be necessary to examine each basin separately. Beginning with that of the Arctic Ocean, and proceeding from east to west, we find first the Petchora, which, after receiving its waters chiefly from the west slopes of the Ural Mountains by a number of important affluents, accumulates them into one great flood, which then flows almost due north, and empties itself into a wide estuary remarkable for the number of islands which the alluvial deposits of the river have formed within it. The Petchora is the only large river of European Russia which thus sends its waters directly to the Arctic Ocean, all the others are received by it indirectly through the medium of the White Sea. Their names are the Mezen, Northern Dvina, and Onega. By far the most important of the three is the Dvina, which, receiving its supplies in nearly equal quantities from the east by the Vitchevga, and from the west by the Suchona, proceeds north west in a very circuitous course, continually augmented by large affluents, and falls into the Gulf of Archangel, a little below the well known port of that name. The surface drained by the rivers of this basin is almost entirely confined to the two extensive governments of Archangel and Vologda. The basin next in order is that of the Baltic. Its principal rivers are the Kemi and Torneå (the latter common to both Russia and Sweden), which fall into the Gulf of Bothnia, the Kymmene, Neva, and Narva or Narowa, which fall into the Gulf of Finland, the Aa and Duna or Western Dvina, which fall into the Gulf of Riga, the Niemen or Memel, which enters Prussia before terminating its course, and the West Bug, an affluent of the Vistula. To the basin of the Black Sea belong the Dniester, South Bug, and Dneper, which have all their mouths at a short distance from each other in the neighbourhood of the rising seaport of Odessa, the Don, which falls into the north east extremity of the Sea of Azof, and the Kuban, which derives its chief supplies from Circassia. The last basin, that of the Caspian, is in some respects the most remarkable of all, since, though Europe sends it at most only two large rivers, the Ural and the Volga, both supplied in part from Asiatic sources, the latter not only surpasses all other Russian rivers, but is one of the greatest of which Europe can boast. The lakes of Russia are on a scale of magnificence fully commensurate with that of the rivers. To say nothing of the Caspian itself—which, being wholly surrounded by land, and even incapable, from the lowness of its level, of discharging itself into any other sea, is truly a lake—Russia can produce others of vast extent which, from lying wholly within its limits, are peculiarly its own. It is somewhat curious that all the larger lakes belong to the northern basins, and with scarcely a single exception to the basin of the Baltic. To it at least belong Ladoga, the largest lake in Europe, Onega, Peipus, and Ilmen. Finland, too, which toward its south extremity is a mere net work of lakes, sends all its waters to the Baltic. Almost all the other lakes of any consequence belong to the basin of the Volga. Their dimensions are much inferior to those already mentioned, but in any other country less amply provided

VOL. XII.

such lakes as the Bielo-Ozero, in the government of Novgorod, and the Koubinskoe, in the government of Vologda, would not pass unnoticed. In the south are several large salt-lakes, among which may be mentioned the Elton and the Khaki Salt Marsh, in the government of Astrakhan. In concluding this part of the subject it is necessary to mention that the east parts of the governments of Perm and Orenburg, which we have included in European Russia, belong to the basin of the Obi, which receives several large affluents from their slopes on the east side of the Ural chain.

Climate—A country extending over at least 35 degrees of latitude, from the warmer regions of the temperate far into the regions of the frozen zone, must exhibit several very marked diversities of climate. It is usual accordingly to consider it in four distinct divisions—a polar region, including all the country north of lat 67°, a cold region, extending from lat 67° to 57° N, a temperate region, from lat 57° to 50° N, and a warm region, from lat 50° to 37° N. Another division, founded on the vegetation of the different regions, has been proposed—1, the region of ice, where vegetation is all but extinct, 2, the region of *tundras*, or moorland steppes, 3, the region of forests and pastures, 4, the region of commencing agriculture, where barley ripens, 5, the region of rye and flax, 6, the region of wheat and orchards, 7, the region of maize and vines, and 8, the region of the olive and the sugar-cane. In regard to the climate in general it may be observed that its characteristic features are a greater coldness and variableness than is common under the same latitudes in the more westerly parts of Europe. The mean annual temperature of the upper part of the Norwegian coast to its extremity at the North Cape is above the freezing point, whereas a considerable portion of Russia within the same, and even in a lower latitude, is below it. This is true of the whole of Russian Lapland as far south as 66°, and to the east of the White Sea the thermal line, indicating a mean annual temperature of freezing, descends so rapidly that on reaching the Ural Mountains it is found to be as low as 60°. The region to which the name of cold has been given has a mean annual temperature varying between 32° and 40°, but very unequally divided throughout the year, the cold in winter often sinking the thermometer to 30° below zero, or 62° below freezing, while the summer heat often raises it above 80°. At St Petersburg, considerably below the centre of this region, the mean annual temperature is rather above 40°, on the other hand, that of Kazan, situated at the very south extremity of the region, but much farther inland, is rather below 36°. The temperate region, situated between lat 57° and 50° N, has a mean annual temperature varying from 40° to 50°, and includes within it the far finest part of the Russian territory, though even there the thermometer has a very wide range, the summer heat which suffices to grow melons and similar fruits in the open field being often succeeded by very rigorous winters. The warm region, extending from 50° southwards, well merits the name from its extreme summer-heats, the thermometer in June and July standing commonly about 100°, and often considerably higher. It is not, however, free from the remarkable contrasts which a Russian summer and a Russian winter exhibit, for the Sea of Azof, situated almost in the heart of this region, usually freezes about the beginning of November, and is seldom open again before the beginning of April. In all the countries bordering on the shores of the Baltic Sea and the Arctic Ocean, and bounded on the west and north by the basin of the Volga, the air is charged with a superabundance of mois-

342

ture, which descends in mists and frequent falls of rain or snow Towards the centre, and still farther east, the superabundance of moisture disappears, though enough still remains to keep vegetation in full vigour even at the hottest season. Still farther south the want of rain is often felt, and long continued droughts do frequent mischief. In general, however, the climates of all the regions are not unfavourable to health, and except in particular districts, where the insalubrity can easily be traced to local causes, disease is by no means prevalent, and human life often attains its longest term.

Geology —The geological formations of Russia have been first accurately made known by Sir Roderick Murchison and his coadjutors. Following their investigations we find in the north-west a vast tract of gneiss and other crystalline schists, penetrated by granite, extending west from the Gulf of Bothnia, and north from the Gulf of Finland over the whole principality of the latter name, the western part of the government of Olonetz, and the extensive part of the government of Archangel which is isolated from its main body by the White Sea. The only other region where a similar development occurs is in the south, where a large granitic steppe stretches in a south east direction. It commences near Ovrutch, in the north east of the government of Volhynia, covers the far greater part of the government of Kief, as much of the government of Podolsk as lies north of the Bug, the northern half of the government of Kherson, the west and south of Ekaterinoslaf, and a part of Taurida, and terminates just before reaching the shores of the Sea of Azof, from which it is excluded by a narrow belt of tertiary marls and limestone. In the east, however, and along the whole crest of the Ural Mountains, from their commencement on the shores of the Arctic Ocean, and almost continuously southward to their last ramifications, granite of more recent origin than that already mentioned occurs, in connection with other eruptive rocks of greenstone, porphyry, granite, serpentine, &c. These rocks are overlain on both sides of the chain by metamorphic schists, forming long and narrow belts nearly parallel with its principal axis. Immediately to the west appears a similar belt of Silurian strata, which, where lowest in the series, are in the state of chloritic and talcose schists. The only other locality where the Silurian system receives a marked development is on the southern shores of the Gulf of Finland, where it stretches from its western extremity east along the governments of Esthonia and St Petersburg, and is then continued across the isthmus between the eastern extremity of the gulf and Lake Ladoga, and along the southern and south eastern shores of that lake. In immediate contact with this Silurian formation on the south, but on a much more magnificent scale of development, appears the Devonian system, or old red sandstone, as it is sometimes called. The main body of this formation commences near the south eastern shores of the Baltic, and gradually widens out with its north eastern and south eastern sides, so as to assume the shape of a wedge. It then forms a wide fork, sending one of its legs north-east across Lake Onega, and along Archangel Bay to the north western extremity of Mezen Bay, and the other leg south east to the north-western frontiers of Voronej. It thus covers continuously the whole of the governments of Kurland, Livonia, Vitebsk, and Pskof, and parts of Vilna, Minsk, Mohilef, and Smolensk, on the one side, and of Petersburg and Novgorod on the other, while its north-east branch traverses Olonetz, and penetrates into Archangel, and its south-east branch stretches over considerable parts of Kaluga, Orel, and Tula. The only other localities in which the same formation

occurs is as a belt stretching s s e from the eastern shore of the Gulf of Tcheskaja in the Arctic Ocean, and in a longer but narrower belt on the western side of the Ural chain, where it immediately overlies the Silurian formation already mentioned. The formation next in order is the carboniferous. The main body of it lies within the above fork of the old red sandstone, and in immediate contact with it, and then keeping parallel with the north east branch of the fork, is continued in the same direction to its termination in Mezen Bay. It occupies the whole of the government of Tver, the capital of which is situated near its centre, and large parts of Smolensk, Kaluga, Tula, and Riazan on the one side, and of Novgorod and Olonetz on the other. The government of Moscow is situated in the very heart of it, and that of Vladimir on its eastern side. It is evidently continued beneath these governments, and covers part of their surface, the other and far greater part being covered by oolite or Jura limestone. The carboniferous system occurs in other two distant and isolated localities, the one in the south, a little north of the Sea of Azof, where it occupies the eastern part of the government of Ekaterinoslaf, and the western extremity of that of Don Cossacks, and where, too, the coal forming the characteristic mineral of the system is partially worked by pits, the other locality is on the western side of the Ural chain, where, in the ascending series, it succeeds the Silurian and Devonian systems, and has a larger development than either of them. This development of the carboniferous system on the side of the Ural chain, and the still larger development above described as existing in the governments of Smolensk, Kaluga, &c., form the opposite boundaries of a system which in European Russia is magnificently developed, and to which, from the large space which it covers in Perm and the contiguous governments, Sir R. Murchison gave the name of the Permian system. Its rocks belong to the upper part of the coal measures, and consist chiefly of magnesian limestone and new red sandstone. The latter name is still often applied to the whole system. In Russia the main body of it, though somewhat irregular in shape, may be considered as an immense triangle, the three angles of which have their respective vertices at Ustiupna, in the government of Novgorod, Mezen, near the bay of same name, in the government of Archangel, and Orsk, on the Ural, in the government of Orenburg. Vast as this space appears, it must still be increased by supposing that the line which joins Mezen and Orsk, and forms the longest side of the triangle, is not made perfectly straight, but curves eastward so as to include the districts around the towns of Tcherdim, Solikansk, Perm, and Ufa. A glance at the map will show that the Permian system, as traced by these limits, must extend over the whole governments of Kostroma, Viatka, and Kazan, and large parts of Archangel, Vologda, Yaroslaf, Nijni Novgorod, Simbirsk, Orenburg, and Perm. Its continuity over the whole of this space is undoubted, but in the north of the governments of Kostroma and Viatka, and more especially in the part of Vologda between the towns of Nikolsk and Ust Sisolsk, it disappears for a time beneath strata belonging to the Jurassic or oolitic system. This system is developed partially in several other localities, and very largely in the north east of the government of Archangel. Immediately above it in the geological series is the cretaceous system, of which the principal localities are Chernogof, Orel, Kursk, Kharkof, and Voronej, near the centre, Volhynia and a small part of Poland in the west, and a long tract along the northern base of the Caucasus. The rocks next in succession belong to the tertiary formation, which in both its eocene and meo-

ocene periods is very largely developed. Strata of the eocene period, commencing in the east in the government of Simbirsk, stretch west over the greater part of the governments of Penza and Tambov, then, after a considerable interruption, reappear on the frontiers of Kursk and Kharkof, cover the far greater part of the governments of Chernigof and Poltava, and are thence continued without interruption into the governments of Mohilef, Minsk, Grodno, and finally into Poland. The miocene period has its chief developments in Volhynia, Podolsk, and Bessarabia. Beds of still more recent formation may be traced in the limestones, marls, and clays on the north-western shores of the Black Sea, on the far greater part of the Peninsula of the Crimea, on the eastern and northern shores of the Sea of Azof, on the low flats along the western and northern shores of the Caspian, and the low, sandy steppes of Astrakhan. Mere alluvial deposits, of comparatively recent date, are to be found in a greater or less degree at the mouths of all the rivers, and are particularly discernible in the great estuary of the Petchora. As a curious and interesting fact connected with geology may be mentioned the vast numbers of erratic blocks and similar drift spread over the greater part of Northern Russia, and evidently transported into it from Finland, Lapland, and Sweden.

Vegetation, Agriculture, &c.—Russia possesses a vast number of phanerogamous plants, but as the examination which botanists have made is acknowledged to be very imperfect, it is probable that many yet remain to be discovered. A considerable proportion of the surface still continues almost in a state of nature, and, where it is well wooded there is room to question whether any other mode of occupation could be made to prove equally productive. Forests, however, are found chiefly in the more northern governments, particularly Archangel, Vologda, and Perm. In many of the central and southern governments a deficiency of timber is seriously felt, and many extraordinary expedients are resorted to in order to obtain adequate supplies of fuel. The governments most imperfectly provided with wood are Esthonia, Bessarabia, Kherson, Ekaterinoslaf, and Astrakhan. The prevailing trees of the northern forests are fir, larch, alder, and birch. The oak is seldom found beyond lat 61°, few fruit trees are found beyond lat 56°, and their regular culture cannot be profitably carried on beyond lat 53° N. There apples, pears, and plums become tolerably abundant, and still farther south peaches, apricots, quinces, almonds, and pomegranates become common fruits. The vine and mulberry also are extensively cultivated, and considerable quantities both of wine and silk are obtained. In the Crimea extensive vineyards have been formed with plants selected with the utmost care, and several of the wines have already acquired a high name. Other governments have imitated the example, and the export of wine promises to become an object of great national importance. Among the principal districts in which the culture of the vine is regarded as an object of primary importance may be mentioned Bessarabia, Kherson, Kief, Astrakhan, and the Don Cossacks. The last makes large quantities of a wine resembling champagne, which finds a ready sale in St Petersburg, Moscow, and many of the larger towns. But it is to agriculture properly so called that Russia must long continue to look for the richest source of national prosperity. After deducting all the regions where the rigours of the climate, without making the growth and ripening of grain absolutely impossible, are incompatible with its culture as a regular branch of industry, vast tracts of land remain, where the soil is almost of inexhaustible fertility, and all the cereals are produced in such abundance as not only to meet

the home consumption but leave a large surplus for export. The most important crops raised for food are rye, wheat, barley, oats, buck-wheat, maize, and potatoes, and for other purposes, hemp, flax, hops, tobacco, and beet root for sugar. The principal wheat districts are parts of Poland, particularly the governments of Warsaw, Radom, and Lublin, the fertile, alluvial tracts along the banks of northern rivers, and the governments of Volhynia, Podolsk, Kief, and Poltava. Rye, from its natural adaptation to the soil, and its almost universal use as an article of food, is cultivated in every quarter up to lat 65°. Barley ripens in lat 67°, but is in far less general repute than rye. Oats are extensively grown in several governments, and more especially in the rich alluvial tracts of Archangel, where the peasants, after satisfying their own wants, grind the surplus into meal, and export it in considerable quantities to the coast of Norway. Maize forms one of the most important crops of Bessarabia, where a return of sixty fold is said not to be uncommon. Potatoes are largely grown in Saratof, in Poland, and in the districts which border the Baltic, in the last partly for food, but much more for the supply of numerous distilleries, which are employed in converting them into brandy. Both hemp and flax are staple products. The former is grown to an immense extent in all the governments which border on the Ural chain, and on both sides of the upper course of the Volga, particularly in the governments of Tver, Yaroslaf, and Kostroma. Flax is also cultivated to a great extent in the same districts, but more especially in the governments of Olonetz, Vologda, Livonia, and the southern parts of Finland. Both their fibre and their seed form most important articles of export from the ports of Riga, St Petersburg, and Archangel. Kitchen gardens, in many parts, attract considerable attention, and cabbages, turnips, carrots, and onions are occasionally cultivated on an extensive scale, in some of the districts bordering on the southern steppes the water melon thrives amazingly, attaining immense size with little culture, and, while in season, forms a principal food of the lower classes. In Astrakhan, on the banks of the Volga, liquorice grows with a luxuriance unknown elsewhere, and furnishes juice sufficient to form an important article of export. Before leaving this part of the subject it is proper to observe that, though Russia is decidedly an agricultural country, its progress in the science of agriculture has hitherto been slow, and the amount of produce obtained is much more owing to the natural fertility of the soil than to any ability displayed in extracting it. There is perhaps no country in Europe in which so much corn is obtained at so small an expense of skill and labour. In Livonia, however, and the Baltic provinces generally, and in some of the more celebrated wheat districts of the Ukraine, an improved husbandry has been introduced, and government, by the appointment of agricultural chairs in the universities, and the formation of model farms, is laudably endeavouring to extend it to other quarters.

Zoology.—Animals, both domestic and wild, are extremely numerous in Russia. Among the former are horses of various breeds, of which those in the north are generally small but hardy, those of the central and south provinces large and well adapted for draught, and those of the Cossacks remarkable for their spirit and endurance of fatigue, and their admirable adaptation for light cavalry. In several of the steppes horses still run wild. Cattle are much used, particularly in the south, for agricultural operations, and exist in such numbers that tallow and hides form very important articles of export. The best breeds are those of the Ukraine, Archangel,

Bessarabia, and Grodno In Livonia a great number of excellent cows are kept for the dairy, and much good cheese is made. The sheep are chiefly of three breeds—the original Russian, which is found in vast numbers in every part of the country, and though generally inferior, and producing a very different wool, has been of late greatly improved by crossing with the merino and Saxon, the Kirghiz breed, remarkable for large size, a darkish red colour, long but coarse wool, and more especially for their ponderous tails, from which from 30 lbs to 40 lbs of tallow are obtained, and existing in vast numbers on the steppes of the Volga, and the Circassian breed, not confined to the Caucasian provinces, but widely diffused in the Crimea, and among the Cossacks of the Black Sea and of the Don. The improved breeds of sheep are found especially in the Baltic governments of Livonia, Esthonia, and Kurland, but are rapidly spreading into other quarters. Goats are numerous in the south, where they are valued chiefly for their skins, which are used in making morocco leather. In some districts Angora goats are kept for their fleeces, which are remarkably fine, and manufactured into shawls. In the northern regions, bordering on the Arctic Ocean, large herds of reindeer are kept, and in the south, at the opposite extremity, among the Tartars of the Crimea and the inhabitants of the Caucasus, the camel is often seen. Among wild animals may be mentioned the bear, the wolf, wild hog, the desman, the mole rat, the saiga, the bobak or Russian marmot, the elk, the bison, the lynx, and various animals which are hunted for their furs. Wild fowl abound, particularly near the mouths of rivers, among others may be mentioned the pelican, which frequents the shores of the Black Sea. Both on the coasts and in the rivers a great number of productive fisheries are carried on. In the Arctic Ocean whales are killed, and vast numbers of seals are taken. The rivers of the Caspian, particularly the Ural and Volga, and the Sea of Azof, are celebrated for their sturgeon. In the same quarters are also important salmon fisheries.

Minerals—These are both numerous and very valuable. Gold is obtained in large quantities, both by mining and washing, on the slopes of the Ural Mountains. The richer deposits, however with a few exceptions, are found on the east side of the chain, and therefore belong more properly to Asiatic than to European Russia. Gold has also been found in the north west of Russian Lapland. Copper is found both in the Valdai and the Ural Mountains. To the west of the latter, in all the low country of Perm, are vast cupriferous deposits, from which large quantities of metal are annually obtained under the most favourable circumstances, the workings themselves being not only comparatively easy, but all the materials necessary for smelting existing in their immediate vicinity. The governments of Olonetz, Viatka, Kazan, Vologda, and Orenburg have also their copper mines. Iron, the most widely diffused of all the Russian metals, is found not only among the mountains, but in the lowest marshy grounds of Finland and the northern governments, where extensive beds of bog iron ore have been formed. The principal seat of the iron manufacture is in the government of Perm, but important workings are carried on, and great numbers of blast furnaces have been erected, in many other quarters. Near Zlatoust, to the west of the Urals, there are important limonite deposits, but east of the Urals, at Nijni Tagilsk, magnetite is worked. Lead is more sparingly diffused, and is worked chiefly in the Ural chain and some parts of Poland, particularly the vicinity of Cracow and Sandomir. It sometimes contains such a percentage of silver as to make it worth extracting

Platinum has long been worked in the Ural chain, in the most productive mines of that metal which are known to exist in the world. Zinc is worked in Poland, in the government of Piotrkov, and quicksilver is mined in the south, in the government of Ekaterinoslav. The latter government also yields a considerable amount of manganese. Salt is found in such abundance, both in brine pits and mines, that it may be considered altogether inexhaustible. In almost every part of the vast extent of surface already described as belonging geologically to the Permian system it may easily be found, and in numerous localities is extensively and profitably worked. It is also very abundant in the south-eastern steppes. Saltpetre is found chiefly in the government of Astrakhan. From the vast extent of country which has been shown to be occupied by the carboniferous system it may be reasonably concluded that many extensive coal fields must exist. It would seem, however, that Russia in this respect bears a considerable resemblance to Ireland, where the large developments of the carboniferous system are chiefly confined to its lower strata, and is much more remarkable for its immense masses of mountain limestone than its productive seams of coal. The most important and most productive coal basin is that situated north of the Sea of Azov, and traversed by the river Donetz. It has an area of over 10,000 square miles, and yields bituminous coal in the west and anthracite in the south. Its production has greatly increased in recent years. Rostov and Mariupol are the ports of this region. Another valuable coal basin is that of Dombrovo, in south-western Poland, and there is a less productive one in the south of the government of Moscow. The coal district to the west of the Urals is traversed by a line of railway. In the centre of the beet root sugar producing country, about Kief and Elizabethgrad, is another vein of coal. With the increase and improvement of railway communication the output of coal has shown a marked increase. For 1868 the output for Russia (Poland excepted) was only 147,500 tons, in 1872 it reached 530,000 tons, and in 1899 it had increased to 13,705,000 tons. The chief obstacle to a more general use of coal throughout the empire is the excessive dearthness of transport by rail, which frequently even surpasses the price of the coal. For the smelting of metals the boundless forests furnish a more valuable and convenient material, and many years must elapse before these can be so much thinned as to make either the search for coal or the working of it objects of paramount importance. Naphtha springs are found in the province of Archangel, in that of Samara and elsewhere, but the better known and richer naphtha or petroleum springs are situated to the north and south of the Caucasus range, especially in the country around Baku. In this region there are immense underground stores of the valuable fluid, and the petroleum industry has here developed enormously in quite recent years, so that Russian petroleum has now driven the American article from some of its best markets. The only other mineral products deserving of notice are quarries of granite and marble, both of which, of excellent quality, are found near the shores and to the north east of Lake Ladoga, and kaolin, which is worked in the governments of Kherson and Chernigov.

Manufactures and Trade—In a country where so much land remains to be taken into cultivation, and population is very much scattered, manufactures cannot be expected to be carried on upon an extensive scale, except in a few leading towns. Considering the unfavourable circumstances the progress of Russia in manufactures is much greater than could

have been anticipated, and certainly much greater than it could have been had not a succession of monarchs, commencing with Peter the Great, done the utmost to promote it, both by the establishment of large model manufactories and various other modes of encouragement. The branches in which most progress has been made are leather, both ordinary and morocco, the latter particularly at Astrakhan, Torjok in the government of Tver, Kazan, and Taurida, in all of which the article produced is unsurpassed in any other country in Europe, cotton twist and cotton goods at St. Petersburg, Moscow, and in the governments of Vladimir, Kostroma, and Piotrkov, woollen and linen goods in many parts of Poland, the governments of Kief, Ekaterinoslav, Moscow, Kaluga, and most of the principal towns, silks, particularly at St. Petersburg and Moscow, sail cloth, at these two capitals, and also in the governments of Archangel, Riazan, and Novgorod, fine cashmere shawls, in the governments of Penza and Ekaterinoslav, fine carpets at Kamenskoi, Smolensk, and Kursk, cordage, at Archangel and in the government of Orel, metals, more especially iron and copper, in the government of Perm, and many other localities, firearms and cutlery, in the governments of Tula, Nijni Novgorod, and Vladimir, swords and edged weapons near Zlatoust, in the government of Ufa, plate glass and crystal, at St. Petersburg, Tula, Tver, and in the Donetz basin, paper, at Moscow, St. Petersburg, Yaroslaf, Kaluga, and in Livonia, hosiery at Sarepta and various other places, and oil, candles, soap, glue, tobacco, window glass, glass bottles, &c., in almost every important town. The total number of persons employed in manufactories, mines and other establishments as recently given was about 1,400,000, the yearly production being valued at £185,000,000. Raw cotton for manufacture is imported annually to the value of from £6,000,000 to £10,000,000. Wool and silk are also imported. Russian commerce is now very extensive. It is true that, considering the vast extent of country, the seaports are very few, being almost confined to Archangel, in the Arctic Ocean, St. Petersburg and Riga, in the Baltic, Odessa and some minor ones, in the Black Sea, Taganrog and Rostov, in the Sea of Azof, and Astrakhan, Baku, and Kizhar, in the Caspian. The great distances at which the seas containing these ports are situated from each other and from the interior of the country must have confined the foreign trade within very narrow limits had not a remarkable number of internal feeders been provided, partly by nature and partly by art, by nature, in the magnificent streams which wind across the country in all directions, and owing to the general flatness of the surface are eminently adapted for navigation, and by art, first in the great system of canals by which the different basins to which these rivers belong have been made to communicate with each other, so as to give a continuous navigation from the Arctic Ocean to the Black Sea, and from the Baltic to the Caspian, together with a network of branch canals, by which all the great towns of the interior have ready access to their outports and to each other, and secondly in the system of railways, by which internal commerce will eventually be still more thoroughly opened up. The railway system was begun by the Emperor Nicholas, and has been carried out more fully and comprehensively under his successors. Some of the lines are formed directly by the state, others by private companies under guarantees from government. The greatest railway undertaking in the empire is the Trans-Siberian line, now practically completed, from Chelyabinsk to Vladivostok and Port Arthur.

The total length of railways open for traffic in the end of 1901 (including Asiatic Russia) was 36,526 miles, of which about 23,400 miles were state railways. European Russia had 27,500 miles of railway. Among the most important lines in operation are that which unites St. Petersburg and Moscow with Warsaw, and through it with the railway system of Europe, the lines from Moscow to Nijni Novgorod and Riazan, from Orel to Vitebsk, Voronj to Rostow (government of Yaroslaf), Dunaberg to Vitebsk, Kursk to Kief and to Kharkof, Kharkof to Azof, and the line from Odessa to the interior. Russia has few large towns. St. Petersburg, Moscow, Warsaw, and Odessa are the first in point of size, and many of the inhabitants of these and other large towns are foreign traders. The capital has now very little less than 1,500,000 inhabitants.

The values of the general exports and imports (exclusive of specie) of Russia for various recent years were as follows (taking ten paper roubles as equal to £1) —

Years	Exports	Imports
1881	£50,640,000	£51,770,000
1885	53,800,000	43,380,000
1891	72,003,700	37,854,600
1894	69,102,395	57,037,083
1895	68,008,200	53,850,800
1896	68,857,200	58,981,000
1897	72,062,400	55,990,800
1898	73,267,300	61,745,900
1899	62,608,900	65,048,500
1900	68,855,200	57,249,000

The chief trade is with Great Britain and Germany. Above a fifth of the exports go to the former, and the latter supplies about 40 per cent of the imports. The exports from Russia to Britain, and the imports from Britain into Russia, in several recent years were as under —

Years	Exports	Imports
1889	£27,154,400	£5,332,251
1895	24,736,800	10,646,340
1899	12,916,200	12,940,300
1900	14,556,400	12,817,000

The exports to Great Britain are nearly equally divided between the northern and southern ports, the imports from this country are mostly received at the northern ports. The chief exports to Great Britain in 1900 were timber, £6,216,309, oats, £2,723,758, flax and tow, £1,548,569, wheat, £1,526,300, barley, £1,262,642, eggs, £1,109,553, and linseed, £997,634. The principal imports from Great Britain in the same year were coal, machinery, iron, woollens, ships, copper, and lead. Besides Britain and Germany, a considerable trade is carried on with Sweden and Norway, Austria, Turkey in Europe, Greece, as well as with China, Persia, and other eastern countries in tea, silk, &c., in exchange for furs, leather, and fabrics of European manufacture.

Government and Laws.—The emperor (the *czar* or *tsar*) is an absolute ruler having entire control of the legislative, executive, and judicial functions of government, and being irresponsible for their exercise. Since the time of Peter I the czar has been head of the church. The title *czar*, or autocrat, was borne by the emperors until the time of Alexander II, who with his successors prefer to adopt the title of emperor. By a decree of Peter I in 1722 the sovereign was authorized to elect his successor, without regard to the law of primogeniture. This was altered by Paul I, who in 1797 fixed the succession according to the law of primogeniture, with preference to the male line. Alexander I recognized the duty of the emperor to govern according to law, and the right of the senate to remonstrate. It is a fundamental law of the realm, established by Peter

I, that the sovereign and the royal family must be members of the orthodox Greek Church. By a decree of Alexander I the issue of any member of the royal family marrying without the consent of the emperor forfeit the right of succession.

The administration is conducted under the control of the private cabinet of the empire by four great councils. The council of the empire, established on its present organization by Alexander I in 1810, consists of the ministers *ex officio*, the princes of the imperial house, and an unlimited number of members appointed by the emperor. It meets collectively under a president, and is also divided for administrative purposes into four sections, each of which has a separate president. The sections severally superintend the departments of legislation, civil and church administration, finance, and industry.

The senate, established by Peter I in 1711, is the high court of justice of the empire, and controls all the legal tribunals. It is divided into six sections, which administer the affairs of different provinces. All the sections now sit at St Petersburg. The senate consists of men of rank, not exclusively of the legal profession. Each section is presided over by a lawyer, who signs its decrees as the representative of the emperor. The minister of justice presides in the meetings of the whole senate. This court has the power to audit public accounts, the patronage of numerous offices, and the right to remonstrate with the emperor.

The Holy Synod, established by Peter I in 1721, superintends the religious affairs of the empire. It comprises the metropolitans of St Petersburg, Moscow, and Kiev (president), the archbishops of Georgia and of Poland, and several bishops sitting in turn.

The committee of ministers is divided into eleven departments, each presided over by a principal minister and member of the council, who are assisted in the departmental work by subordinates. The various ministries are the imperial house, foreign affairs, war, navy, interior, public instruction, finance, justice, agriculture, public works, general control. The procurator general of the Holy Synod, several examiners, and others are also members.

The emperor has two private cabinets, one dealing with charitable affairs, and the other devoted to public instruction of girls and the administration of institutions established by the mother of Nicholas I. In addition there is the imperial head-quarters and a cabinet entrusted with the reception of petitions. There is also an imperial cabinet with sections dealing with economy, mines and manufactures, and legislation.

Various parts of the empire are governed by different codes, the laws and institutions of Finland and Poland being partly respected, the former having a quasi independent form of government. The provinces are under general governors or viceroys, who exercise a general control of the administration in the name of the emperor. The country is subdivided into communes, which have the free administration of local affairs. Finland has nominally preserved its ancient constitution with a national parliament of four estates, but is really governed by a governor general and senate appointed by the emperor. Poland was finally incorporated with Russia in 1808. A voluminous code, called the *Svod Zakonow* or *Corpus Juris*, has been drawn up for the empire, and declared to contain the law of Russia in so far as not modified by the laws and privileges of particular provinces. It contains an abstract of all the laws and ordinances issued by the different emperors from 1649 downwards, and forms fifteen large volumes. The laws and ordinances in full, but reaching only to 1832,

are contained in fifty-six volumes, of this immense collection eight volumes belong to the first seven years of the reign of the Emperor Nicholas I.

Finance—Taking the paper rouble as equal to a florin (see next section), the total estimated revenue for 1902 was £194,657,198, of which £180,078,448 represented ordinary revenue. The total expenditure was made to amount to the same sum, and included £177,591,348 of ordinary expenditure. The ordinary revenue thus exceeded the ordinary expenditure by about £2,500,000. The chief sources of revenue are direct taxes, indirect taxes (customs, &c.), posts, telegraphs, mines, spirit monopoly, railways, and forests, and the principal items of expenditure are those represented by administration, public debt, army, navy, pensions, and railways. The total public debt amounted on Jan 1, 1901, to £621,056,000, much of it representing railway obligations. The debt charge included in the expenditure of 1902 amounted to £28,646,000. The revenue and expenditure of Finland in 1901 were balanced at £4,267,345, and the debt was £4,457,955, almost all contracted since 1889.

Money, Weights, and Measures—The present currency system of Russia was fixed by laws passed in 1885 and 1897. The unit of account, represented by a silver coin, is the rouble of 100 kopecks, valued at 3s 2d sterling. There are three gold coins, the imperial (10 roubles), the half imperial (5 roubles), and the one third imperial. Besides the rouble the following are coined in silver: half rouble or poltinnick (50 kopecks), quarter rouble (nearly equal to a franc), and pieces of 20, 15, 10, and 5 kopecks. The copper coins are 3, 2, 1, $\frac{1}{2}$, and $\frac{1}{4}$ kopeck, besides the 5 kopeck copper piece not now coined. The law of 1897 fixed the currency on a gold basis, the rouble in gold being declared equal to $1\frac{1}{2}$ rouble in paper. Thus the value of the paper rouble is 2s 1½d. The rouble as the fiftieth part of the gold imperial is the unit in all payments and business transactions. The circulation of the silver pieces representing 1, $\frac{1}{2}$, and $\frac{1}{4}$ rouble is limited by a ukase of 1898 to three roubles per head of the population, and in ordinary transactions these coins are legal tender up to 25 roubles only. Notes of the value of 1, 3, 5, 10, 20, 50, 100, 1000, and 2000 roubles are issued by the State Bank, but since 1897 the one and three rouble notes are being replaced by silver roubles. By a ukase of 1897 the issue of paper money was restricted. Up to six hundred million roubles the bank must secure its issue of notes by a gold reserve representing half the issue, and beyond that amount the gold reserve must be equal to the issue, rouble for rouble. Since 1877 the monetary unit of Finland has been the mark, equal to a franc. The coins include 20 mark and 10 mark gold pieces, 2 mark, 1 mark, $\frac{1}{2}$ mark, and $\frac{1}{4}$ mark silver pieces, and three smaller bronze pieces. One mark is equal to 100 pennia (singular, penni). Silver is a legal tender only up to ten marks. The Russian unit of length is the foot, equal to the British foot, and like it divided into 12 inches. Higher units are the arshin, equal to 28 inches, the sajene, equal to seven feet, and the verst, equal to 500 sajenes or 3500 feet. A dessiatine is equal to 2400 square sajenes, or nearly 27 acres. The standard of capacity for liquids is the shtof, equal to 27069 pints or 93.82 cubic inches. A vedro is equal to eight shtofs. The unit of capacity for dry goods is the chetwerik, equal to 5774835 gallons. A higher unit is the chetwert, nearly equal to $5\frac{1}{4}$ bushels. The funt, or unit of weight, is slightly greater than nine-tenths of a pound avoirdupois. Forty funts are equal to one pood. In 1886 the metric system of weights and measures was introduced into Finland.

Religion and Education.—The established religion of Russia is that of the Eastern or Greek Church (See GREEK CHURCH). The Russian Church is established independently under the emperor as supreme and the Metropolitan of Novgorod as ecclesiastical head. It maintains friendly communion with the patriarchates of Constantinople, Jerusalem, Antioch, and Alexandria, and recognizes the authority of the joint patriarchate and of the councils of the whole Eastern Church in matters of doctrine. Religious toleration cannot be said to prevail in Russia, except in favour of foreigners. The members of the orthodox church are not allowed to change their creed, and there have been extensive persecutions directed against Jews and Roman Catholics. There are, however, considerable sects of schismatic Greek Churchmen. The Greek Church, all sects included, is estimated to number in European Russia 75,000,000, the Roman Catholics, 8,300,000, Protestants, 2,950,000, Jews, 3,000,000, Mohammedans, 2,600,000.

About £4,000,000 is annually expended by the state on education. Including secondary and primary schools, the number of educational establishments maintained wholly or in part by government amounts, so far as can be ascertained, to about 50,000, the pupils numbering about 2,500,000. The country is divided into educational districts, but the organization of the means of education is as yet little more than adequate for the education of public officials, and the great mass of the population is wholly uneducated. In Finland, which has a separate system, education is nearly universal.

Army.—The Russian army is recruited mainly by conscription, and its organization has been determined by laws passed in 1871, 1876, 1888 and 1893. All able-bodied males are liable to military service from the age of twenty one completed to the age of forty three completed, with the exception of doctors and teachers (in time of peace) and of the Christian clergy. The period of service comprises eighteen years in the active army, of which four (five for the cavalry, horse artillery, engineers, and some others) are passed with the colours, the rest in the reserve, whilst during the remaining four years required to complete his forty third year the soldier belongs to the first section of the territorial army, which includes also those not drawn for active service during the whole twenty two years of their liability. The second section of the territorial army includes all those drawn for service but not incorporated, for some reason in the permanent army. The Cossack army is organized differently, and liability to service begins on the completion of the eighteenth year. The period of service is diminished in the case of those who possess certain educational qualifications. There are twenty five army corps, namely, the guards (St Petersburg), the grenadiers (Moscow), twenty one territorial corps having their respective head quarters at St. Petersburg, Grodno, Vilna, Minsk, Warsaw (3), Simferopol, Odessa, Kiev (2), Kharkov, Kovno, Vinniza, Smolensk, Lublin, Vitebsk, Moscow, Dorpat, Brest Litovski, and Riga, and the first and second corps of the Caucasus, with head quarters at Alexandropol and Tiflis respectively. Most of these corps are formed of two divisions of infantry, two brigades of field artillery, one division of cavalry, and one section (two battalions) of horse artillery, but the guards and the grenadiers have three divisions of infantry and three brigades of artillery, and the guards corps has two cavalry divisions and one brigade of horse artillery, whilst the numbered corps also present some irregularities. There are also two cavalry corps, with two divisions each, having their head quarters at Warsaw. The total strength of the European army organized in the corps formations

is therefore fifty-two divisions of infantry, twenty-two divisions and two brigades of cavalry, fifty-two brigades of field artillery, and one brigade of horse-artillery. In time of war an army corps consists of two infantry divisions (each 18,000 men) and one cavalry division (4000 men), comprising altogether 40,000 men. Each infantry division in war includes cavalry, artillery, &c., and each cavalry division includes artillery. The strength of a battalion is about 500 in peace and about 1000 in war. The following table shows the approximate effective war strength of the Russian army in 1900—

	Infantry	Cavalry	Artillery	Engineers	Train
Field Troops	1,010,000	123,800	122,500	47,100	26,400
Reserve Troops	691,000	99,300	46,670	10,300	—
Fortress Troops	162,000	—	81,500	12,400	—
Reinforcements	285,000	48,900	38,000	7,400	—
National Defence	605,000	22,350	28,450	4,100	—
Others	41,000	—	—	—	—
Total	2,895,200	294,350	317,720	81,740	26,400

The grand total of all arms is 3,615,110, of whom 66,110 are officers. The fortresses of Russia are Alexandropol, Batum, Brest Litovski, Dvinsk, Dün amunde, Ivangorod, Kars, Kertch, Kiev, Kovno, Cronstadt, Libau, Novogorogievsk, Odessa, Ossovietz, Ochakov, Port, St. Petersburg, Segri, Sevastopol, Svaborg, Warsaw, Vladivostock, and Viborg.

Navy.—In 1901 the strength of the Russian navy was as follows, vessels in course of construction being included—Battleships, 24 (7 first class, 15 second, 2 third), coast defence vessels, 9 (4 modern), armoured cruisers, 3, first class cruisers, 2, other cruisers (protected or belted) 16, torpedo gunboats, &c., 9, destroyers, 30, first class torpedo boats, 43, other torpedo boats, 150, submarines 1, and steam-yachts, trawling ships, &c. The total personnel of the Russian navy is about 46,000.

People.—Ethnologically the peoples of Russia are comprised under two of the great divisions into which the human race is divided—the Caucasian and the Mongolian, but under each a considerable number of varieties are traced. The Mongolian stock in European Russia is represented by the Finns and their allies, and by the Kalmucks, who occupy some of the south eastern steppes, but have lost many of their distinctive features by intermarriage with Caucasians. Of the Caucasian stock the Slavonians, under the names of Russians, Poles, Lithuanians and Letts, Walachians and Servians, form about nine tenths. Of these again the Russians proper form the great body of the population, and are estimated at about 50,000,000. They occupy, with little intermixture, the central provinces between the Dnieper and Volga, form a vast majority in the north, between the Ural Mountains and the White Sea, and, in the south, between the Don and the Dniester, and are found, more or less intermingled with other varieties, in all other parts of the country. The Poles are found in the greatest number in their own country. In that part of it which in the dismemberment fell to the share of Russia they amount to about 9,000,000. The Lithuanians are found chiefly in Northern Poland, and in the governments of Vilna and Minsk. They are estimated at about 1,500,000. Still farther north are the Letts, or as they are often called, Kurs, from living chiefly in Kurland. They are also the chief occupants of Livonia, are wholly devoted to agricultural pursuits, and may amount to 500,000. The Walachians, and among them a few Servians, are found only in Bessarabia, between the Dniester and Pruth. Their language is a descendant of Latin mixed with foreign words. They, too, do not exceed 500,000. The Tchudes, or Finns, though they belong

to the Mongolian race, have little or none of the characteristic Mongolian type of countenance. They are of middle size, fair complexion, and generally have light hair and blue eyes. They are settled on both sides of the Gulf of Finland, but on the north of the gulf form the two marked divisions of Finns proper and Laplanders, the former living south and the latter north of lat 65°. To the south of the gulf the Finns occupy the far greater part of Esthonia and a small part of Livonia. Widely separated from the western Finns, though the mode of separation is not known, a great number of Tchadic or Finnish tribes are found occupying the western slopes of the Ural Mountains and the banks of the Middle Volga under the names of Syrianes, Permians, Voguls, Votiaks, Tchuvasses, Tcheremisses, Mordwins, and Teptiarses. The most numerous are the Tchuvasses and Tcheremisses, who live together on both sides of the Volga, in the neighbourhood of Kazan, and are estimated at about 500,000. All the others do not exceed the same number. The second great branch of Mongolians inhabiting Russia are the Tatars, who here form four distinct tribes—the Tatars of Kazan, in some respects the most civilized nation in Russia, though the great majority of them still cling to Mohammedanism, and numbering about 230,000, the Bashkirs, occupying both sides of the Ural Mountains from lat 56° to 54° N, still given to wandering life, and amounting to about 130,000, the Nogais, occupying a large part of the Crimea and the steppe to the north of it, dispersed over the country east of the Sea of Azoff and the northern base of the Caucasus, and amounting in all to about 600,000, the Metcheriaks, forming a few small tribes, not exceeding 20,000 persons, live among the Bashkirs. The German or Teutonic race inhabiting Russia consist chiefly of Germans and Swedes, intermixed with a few Danes. The Germans are dispersed over the Baltic provinces south of the Gulf of Finland, among the Letts and Esthonians, where they constitute the greater part of the nobility. They are also numerous in St Petersburg, Moscow, and other mercantile towns and seaports, and a considerable number of German colonists are settled in the government of Saratof and other parts of the Middle Volga. The Swedes are numerous both along the eastern shores of the Gulf of Bothnia and the northern shores of the Gulf of Finland. Their number in these localities, and more partially in Esthonia, are supposed to exceed 100,000. The Greeks, dispersed over all the southern provinces as merchants, and in the Crimea, where they are the sole occupants of several villages, are estimated at about 500,000. There are also the Jews, who are seldom found in the central and northern provinces, but are very numerous in ancient Poland, particularly in the governments of Wilna, Grodno, Volhynia, and Podolsk, where they form the far greater part of the urban population. Their number is supposed to exceed 2,900,000.

Tenure of Land and Political Status of People—The political divisions of the Russian people comprise numerous grades of nobility, which are partly hereditary and partly acquired by military and civil service, especially the former, military rank being most highly prized in Russia. The clergy, both regular and secular, form a separate privileged order. The higher clergy were formerly possessed of great wealth, but much of their property was confiscated by Catharine II, who compensated them by state pensions. Previous to the year 1861 the mass of the people were serfs subject to the proprietors of the soil. The Emperors Alexander I and Nicholas took some initial steps towards the emancipation of this class, but a bold and complete scheme of emancipation was begun and carried out

by Alexander II. The decree of emancipation was dated 3d March, 1861, and began to come into execution within two years. There were about 22,000,000 of serfs belonging to private proprietors, and rather more than that number on the crown lands. By an imperial decree of July 8, 1863, lands were granted to the peasants on all the estates of the crown on a forty-nine years' rental equal to the former poll-tax, and as a freehold estate at the expiration of this period. A similar arrangement was made on behalf of the peasants on the lands of private proprietors. The redemption money of the serfs with their land was estimated at sixteen and two thirds years' purchase of their annual produce. Twenty per cent of this had to be paid by the serfs on procuring their emancipation, the remaining 80 per cent is guaranteed by government, which levies it from the peasantry in a tax extending over forty nine years. The emancipation of all the serfs on these terms was arranged for by July, 1865, and from that date this form of servitude has ceased to exist in Russia. Since this change the cultivable land in Russia is mainly distributed among three classes. The crown holds nearly 35 per cent, the emancipated peasants about 20, while the remainder, with the exception of mines and town lands, is in the hands of the nobility and other landed proprietors.

Language—From the number of tribes and races just mentioned it is evident that many different languages and a vast variety of dialects must be spoken. The Russian, however, both as the proper language of the country and the vernacular of at least four-fifths of the inhabitants, is the only one which is necessary here to specify. It is based on the ancient Slavonic, but has been much modified by the introduction of Greek, Tatar, and Mongolian terms. It has an alphabet of thirty seven letters, a written and printed character of a peculiar form, and a pronunciation which it is hardly possible for any but natives to master. Its flexions are both numerous and irregular, making the attainment of it by a foreigner extremely difficult, but it is soft, rich, and sonorous, and though long greatly neglected, and hitherto much richer in translations than in original works, has shown itself fit to be the vehicle of any kind of literature, and, from the attention now paid to it, will probably ere long free itself from one very marked stigma by becoming the court language instead of French, by which the honour has been long usurped. A church dialect was created by the translation into Russ in the tenth century of the books of worship, with the retention of many Greek forms. This dialect remains distinct to the present day, and has considerably modified the vernacular. The Russian language is remarkable for its copiousness, in which it is excelled by few living tongues, but although it has borrowed somewhat from the other languages with which it has come in contact it is nevertheless homogeneous, and does not owe its wealth of expression, like the English, to assimilativeness, but to the great variety of inflections which it admits of, and to the fertility of its roots in forming derivatives. According to Shishkof as many as 2000 derivatives are often formed from a single root. The highly-inflected character of the language admits of great freedom of construction, the connection of a phrase not being dependent on the grammatical order of the words. The verbs denote person, number, and gender, and determine the singularity or frequency of the action, but they are somewhat deficient in tense, there being, strictly speaking, only one tense to represent past time, and one compound tense, the future. The language is rich in poetical expression, and affords unbounded facility for rhyme. The connection of clauses and sentences is simple and natural,

but presents little variety. The purest and most regular dialect of Russian is spoken in the centre of the country in the district round Moscow, but the written dialect is that of Great Russia.

Literature.—The first period, which was the longest and most destitute of literary productions, extends from the foundation of the empire to Lomonosof, who first introduced a permanent change into the Russian language. To this epoch belong the old popular songs and traditions, which, formerly neglected by the Russians, have recently excited their attention on account of their similarity to the English, Spanish, and Scandinavian ballads. Like these ballads they appear to refer to a connected series of popular traditions. The period to which the popular ballads chiefly belong (1015–1124) was under the influence of the old Slavonian mythology (see SLAVES—Mythology), which gives a historical interest as well as a poetical charm to these ancient tales. Vladimir I and his knights form the central point of the whole series, which may be compared to the legends of Charlemagne or King Arthur and the Round Table. The Story of Filipat and Maxim, the Marriage of Devgunas, the Carrying off of Stratigovnas, both in the tale of Shingrip, czar of the Adorians, are among the leading adventures recorded in the classic Russian legends. Important, as contributing to fix the written language, was the introduction of a current written character, whereby the unwieldy letters before used and introduced by Cyril were superseded. (See CYRIL.) For the full expression of the tones which are peculiar to the Russian language, and for which the Greek letters were neither suitable nor sufficient, Cyril had borrowed some characters from the Asiatic alphabets, the form of which was an impediment to a people not fond of writing. About the end of the seventeenth century Elias Kopievitch improved it, and brought the letters to their present form, for the embellishment of which so much has been done in the last forty years, that the Russian characters may compare in beauty of form with those of any European language. The history of the Russian press has in modern times attracted much attention, and a copy of a work printed in 1475 has been found. A Slavonian psalter was printed at Cracow in 1481. The psalter of Kief (1551) is the oldest work printed in Russia itself. Cracow was the cradle of Slavonian typography. The oldest monuments of the language are Oleg's treaty of peace and commerce of the year 912, Igor's treaty with the Greek emperor (945), the municipal charter of Novgorod (1019), but the most important memorials are the Russian laws in the time of Yaroslav (who died in 1054), the expedition of Igor, a heroic poem of the twelfth century, popular songs, and the poems of the Prince Cantimir, in the reign of the Empress Anna. This predecessor of Lomonosof possessed true talent, had received a European education, and was well acquainted with the classics. His poems consist of satires and epistles, in which, in imitation of Horace and Boileau, he described in true colours the manners and faults of his times. The spirit of his poems is modern, the form antique, but his verse is rhymed. He likewise translated into Russian Fontenelle's *Dialogues on the Plurality of Worlds*, but the language was as yet too little refined to preserve the beauty of the original. The beginning of Russian dramatic art dates from this period. The first dramas were founded on religious stories, and were performed by the students of Kief in the principal cities during their holidays. Among the most popular subjects were Judith and Holofernes, Esther, and the Three Jews in the Fiery Furnace. Simeon of Polotsk (1628–80) wrote the dramas of Nebuchadnezzar, the Lost Son, and others on similar subjects. He also

translated the Psalms of David. This period shows only individual monuments of a written language in the first stages of improvement. Peter the Great unintentionally gave it a retrograde direction when he introduced many foreign expressions in place of a great number of existing technical terms, which thus became disused, so that the language itself became poorer, and was disfigured.

The second period extends from Lomonosof (1711–65) to Karaman (1765–1826). Lomonosof, a man of genius, created the language of Russian poetry by the introduction partly of poetical expressions and partly of new forms, which he borrowed principally from the German literature, and which served his successors as models. Russian poetry is peculiar in its rejection of most of those trammels of form to which nearly all other poetry is indebted for its characteristic expression. Even the restriction of verses to a particular number of syllables is considered stiff and unnatural, neither equal lines, assonance, nor rhyme are required, and the measure of verse depends entirely upon certain rules of accentuation. As early as the seventeenth century instances of versification are found in which the Greek usage of long and short syllables is imitated, but they produced little impression on the prevalent taste. Lomonosof's example shows how the Russian language can be enriched and ennobled by expressions and phrases from the Slavonic. He first developed its grammatical structure, and contributed also to form its prose. His odes relate to the circumstances of the day, we find in them little poetry, but much rhetorical richness. In his tragedies the lyric tone prevails, and dramatic power is sought for in them in vain. In epic poetry his Peter the Great was a first attempt, there are individual passages, indeed, of great merit, but the poem, as a whole, is devoid of interest. His imitations of the Psalms are rich in poetical expression. His epistle on the utility of verse shows his great command of the language. Sumarokoff, an author celebrated in his time, is too diffuse upon every subject. His fertility in tragedy and comedy, in satires, epistles, elegies, eclogues, fables, epigrams and songs, gave him reputation, but in no department can he be considered a model. Kersakof has produced two large epics upon the conquest of Kasan and upon Vladimir the Great, besides tragedies, odes, and epistles. His language is beautiful, and far more smooth than that of Lomonosoff, but his talents are much less conspicuous. He was considered in his time as the Homer of Russia, but he is now forgotten. Maykof acquired a reputation by two burlesque poems, which were, however, not the less worthless on that account—Kniashinn imitated the French in his tragedies and comedies, too closely indeed, but not without talent. Some comedies in which he has interwoven many of the follies of the times in which he lived, have maintained themselves upon the stage till the present time. He very much excelled Sumarokoff, and some of his scenes, even now, are read with pleasure, although the language has proceeded so far in improvement—Kostrof deserves mention on account of his translation of the first books of the *Iliad* into Alexandrine verse, and of Ossian into prose. His language is not without force—Bobrof, a wild genius, has left behind him a number of bombastic odes, and a descriptive poem *Tauria*, a chaos, but which contains here and there some brilliant passages—Bogdanovich, author of a poem called *Psyche*, in imitation of *La Fontaine*, is *naïf*, and full of grace and originality, but diffuse and deficient in taste—Oserof belongs, if his language is considered, to this period, although his poems appear in that which followed. The plan of his tragedies is French,

the language neither pure nor beautiful, but the expression is often forcible, and the description of the passions natural, some scenes are really tragic, some of his characters are well delineated and supported.—Petrof was a true poet, but his language is rude, he had many ideas and striking images. He celebrated the victories of Catharine the Great in his odes. His heroes were Potemkin and Romanzof. His translation of the *Æneid* into Alexandrine verse is very unpolished in its language, but is full of power.—Lomonosof also commences the series of prose writers of this period. His eulogies upon Peter the Great and Elizabeth contain few ideas, but much rhetorical ornament. Both of these writings are entirely different from those of his predecessors. They have very much improved the language, but still have not given it a permanent form. The same may be said of his scientific treatises upon electricity and metallurgy, of his Essay towards a Russian grammar, of his Rhetoric, which contains many fragments translated from the ancients. Weissen (Wisn) wrote two comedies in prose, full of genuine humour, which describe in true colours some of the absurdities of the age, both of these have maintained themselves upon the stage. He also wrote two very original satires, and some translations from Montaigne and Turgisson—Muraviev, the tutor of the Emperor Alexander, composed for his noble pupil several treatises upon Russian history, some dialogues of the dead, and some fragments, in the manner of the English Spectator, under the title of the Suburban. His style is not wholly pure, neither has he a great command of language. It is evident that he has formed his style from the imitation of French writers, but he is full of ideas, and particularly rich in imagery. When we read his works we feel that his mind is conversant with all the beauty contained in ancient and modern literature. A good heart, a pure mind, and a love of virtue are conspicuous in everything that he has written. He was in advance of his age. But he had little effect upon his contemporaries, as he permitted but few of his writings to be printed, and his works did not appear till long after his death. In general, it may be said that during this period the genius of Lomonosof awakened a taste for literature in his nation. People eagerly read everything that was printed, particularly poetical productions. In Sumarokof they saw a great tragic writer, and in the poem of Keraskof, with all its defects, an Iliad. They felt the beautiful, but did not know how to distinguish it. Taste was in the cradle, and criticism still unborn. We may consider this age as the awakening period of genius and poetry. In the last half of it a man of genius made his appearance, who belonged to no school, of an original and peculiar mind, without high cultivation, but unique in his kind, and the true representative of Russian poetry. This man was Dershavin. He celebrated the glory of the Russian arms during the reign of Catharine, as did Lomonosof and Petrof, but while these were only eulogists of their sovereign and her generals, Dershavin celebrated them in the true spirit of a poet. He remained a philosopher even at the foot of the throne. His own character appears in whatever he said of others. He awakened great and patriotic feelings, and at the same time described nature with inimitable touches. His productions, however, are not the best models, but they glow with a fire which kindles poetical sentiment. This period produced a great number of translations, particularly from the French, they are all, however, without merit as regards style, but they show the general desire and love of the age for literature. In this age the great dictionary of the Russian Academy appeared, pro-

jected according to an entirely new plan, and in which the etymological order of the words is followed. This work furnishes great facilities for the study of the Russian language and literature. The Russian Academy (founded October 21, 1783) has had great influence in directing the attention of authors to the pure elements of the language, several societies have likewise been formed for the improvement of the language. Finally, one man contributed greatly to the spread of literary taste, who had himself but little learning, but a good natural understanding, a love for the sciences, and withal a happy talent for illustration. This was Novikof. He founded a typographical society, and edited a satirical journal, under the title *The Painter*, which at that time was very much read, and opened to Karamzin a field for the exhibition of his literary powers.

In the third period Karamzin is the representative of prose, and Dmitrieff of poetry. Sumarokof, who wrote the first regular tragedy, *Knashynin*, who distinguished himself both in tragedy and comedy, and Vladimir Oserof, the best dramatic writer, are also worthy of mention. The periodical edited by Dmitrieff, after his return from his travels, effected a decided change in the Russian language. He revealed to his countrymen the secrets of happy diction, clearness, beauty, and precision. The same perfection which he gave to prose, Dmitrieff gave to poetry. Karamzin's career as an author may be distinguished into three epochs. The first began with his editing the *Journal of Moscow*. In this publication appeared fragments of his *Letters of a Travelling Russian*, and his tales, which were afterwards published collectively. These productions exhibit genuine taste, though they appear like the effusions of a youth. His remarks and notices of the writings of foreign countries, which appeared in that publication, excited an interest in foreign literature throughout Russia, and developed the germ of true criticism. The second epoch commenced with the publication of the *European Courier*. This periodical drew the attention of the public to politics, and awakened reflection. His essays upon some of the political topics of the day, and upon morals, are models in their respective kinds. His beautiful style gave to his ideas a still higher charm. The third epoch is marked by his *History of Russia*. This history, as a literary production, is a mine for all authors of his nation. No Russian prose writer since Karamzin has acquired so high a reputation, greater purity, perhaps, prevails than did before, but his style has not been equalled. Many have wished to imitate him, but they have only shown their own inferiority. Makarof edited a *Critical Journal*, he wrote very correctly, but his style is dry. Batushkof has been able to give grace to his prose, and the Italian harmony to his verse. Shukoffskij was, after Karamzin, the editor of the *European Courier*, and wrote in it some essays on prose. These, and other authors, have each of them some peculiar merit, but they are not equal to their master. Besides, their works are unimportant, and cannot, therefore, much promote the further development of the language. The Russian literature is very barren in original works on the subject of philosophy. In the history of the language of poetry Dmitrieff's imitations of *La Fontaine* and his tales make a particular epoch. Before him Lomonosof, and especially Dershavin, had furnished models of poetical beauty, and opened the way to bold originality. Without checking the flight of genius, Dmitrieff knew how to direct it so as not to offend against taste and sound criticism. We possess about 100 excellent fables by him, in imitation of *La Fontaine* and others, many songs, which have become

popular; and odes, considered classical, without having the brilliancy of Derzhavin's originality and boldness. Dmitrief has given the language of Russian poetry its permanent form. Neledinsky-Meletzsky is less pure and correct than Dmitrief, but many of his songs are in the mouths of the common people. The true fire of passion animates his poetry. Chernitszer is esteemed as a fabulist, his expression is natural, but very prosaic. Krylof (1768-1844), a poet in the full sense of the word, is, in his department, like Derzhavin, the representative of the national poetry, for his fables are almost all original. Derzhavin, in his odes, described the bright side of his age, but Krylof, in his fables, painted the absurdities and prosaic thought of his time. In expression less pure and perfect than his predecessor Dmitrief, he however, excels him in descriptive powers. Krylof has much observation in his fables, which in this respect will bear comparison with the best in any literature, are rich in ideas and instruction, many of his verses, therefore, are now current as proverbs.—Shukoffskiy (1783-1852) has enriched the poetical language of the Russians by describing ideas and feelings which had not been treated in their literature. His poems are a true picture of his individual character at the time in which he wrote them. They therefore possess uncommon attraction for the reader. His predilection for German poetry, which was before his time but little known to his countrymen, induced him to incorporate it with the Russian in his imitations, his poems, on this account, have a peculiar stamp, which has given a singular charm to their deep melancholy feeling and natural tone. Butjushkof (1788-1855) pleases by the charms of his diction. With a brilliant imagination he united the finest taste, and he is inimitable in the choice and harmony of his expression. We possess of his writings some amorous elegies, ingenious epistles, and attempts at lyric poetry—all excellent. Prince Wisnitsky expresses much in few words—this sometimes gives his language an air of stiffness and dryness, but his satires and epigrams are particularly happy. His prose suffers still more than his poetry from this brevity.—Wostokoff has richness of thought, power of imagination, and warmth of expression, but his style is but little refined.—Gneditsch (1784-1833) deserves much credit for his translation of the *Iliad* into Russian hexameters. The general characteristic of this period is in elegance and correctness previously foreign to Russian literature. The language has acquired a more settled character, but Russian prose still wants the labour of thinking minds to perfect it. The poetical language of the Russians alone can be called rich. Many Russian writers of this and the following period, it may be mentioned, have preferred to write in foreign languages.

The latest period of Russian literature is yet in its bloom. Its greatest poet, Alexander Pushkin (1799-1838), who is distinguished for his imagination, originality, and refined style, perished in a duel. He was the champion of the romantic school, which has claimed many of the distinguished Russian writers of the later nineteenth century. Next to him comes the poet Lermontoff (1814-41), who had a similar fate. His poems show the influence of Byron. Among other poets may be mentioned Koslof (1779-1840), Griboyedof (murdered at Teheran in 1829), the author of a very amusing comedy, *Gore ot Uma* (Trouble from Cleverness), Delvig (1798-1831), Baratinsky (1800-44), Jarykof (1803-46), and Nenevitinov (1805-27). Russia has produced some eminent novelists in modern times. The first of these is Nicholas Gogol (1809-52), who wrote the satirical novel *Dead Souls* and various

other works, showing much imagination and power of character painting. Ivan Turgeneff (1818-83) has gained a European reputation as a novelist and fertile writer of admirable tales. Alexander Herzen (1812-70) is another well known name and Dostoevsky (1822-81) is also in the front rank of modern Russian novelists. Chief among living novelists is Count Leo Tolstoi. Among the translators we may mention Meislakof. The modern Russian drama may be regarded as founded by Alexander Ostrovsky (1824-86), but Pissensky, Turgeneff, Alexander Tolstoi and others have done excellent work in this department. There are many journals, but they are for the most part filled with extracts from foreign periodicals. The critical department of them cannot be important, because the national literature is poor, nevertheless, among a great number of tolerable prose writers, Grietsch has distinguished himself, his style is easy, although he sometimes offends against good taste. For many years he edited the best Russian journal. He published a Grammar in 1823, second edition in 1834. In connection with this, besides the old Russian grammars of Ludolph (*Grammatica Russica et Manuductio ad Linguam Sclavonicam*, Oxford, 1696, 4to), and of Groning (Stockholm, 1750), that of the fifth Russian Academy (St. Petersburg, 1802), that of Viter (Leipzig, 1808), and that of Tappe, on account of the happily chosen examples and practical exercises (St. Petersburg and Riga, 1810, fifth edition, 1820), deserve to be recommended. The imperial government itself on one occasion took the charge of the grammatical education of the people into its own hand, and an interdiction was imposed by the minister of instruction in 1814 upon the sale of a certain Russian grammar 'on account of its many defects and false definitions'. Various grammars or manuals for the use of English students have been published, such as Riola's *How to Learn Russian*, and his *Graduated Russian Reader with Vocabulary*, W. R. Morrill's *Grammar of the Russian Language*, Kinloch's *Russian Conversation Grammar*, &c. There are numerous Russian grammars for the use of Germans. Of these may be mentioned those by Bynazal (1850), Pihlmann (tenth edn., 1889), Korner (1892), Abicht (1896), and Asboth (1897). The best dictionaries are that of the Russian Academy (1891), and Dahl's Dictionary (1882). There is no satisfactory Russian and English dictionary, but there is an extensive Russian and French one by N. Makarov (St. Petersburg, 1887-88).

History.—The history of Russia as a kingdom begins in the ninth century, when the Slavonian tribes on the eastern shores of the Baltic, who had already attained some degree of civilization, called in a Scandinavian tribe, the Varangians, to assist them against the hostile attempts of their ruder inland neighbours. Like the Anglo-Saxons in similar circumstances, the Varangians conquered the country for themselves. Rurik, one of their chiefs, built a town on Lake Ladoga, on the site of Old Ladoga, which he made the seat of his government about 862. His brothers Sinaf and Truvor established themselves at Belozersk on Lake Biele Ozero and Isborsk. Having defeated a native confederacy under a chief named Vadim, Rurik transferred the seat of government to Novgorod, the capital of the Slaves, in 865. The death of his brothers soon after left him in sole possession of the new empire, into which he called numerous colonies of northmen to support his dominion. The rest of his reign appears to have been undisturbed. He died in 879, and left as his successor a son, Igor, four years of age, under the guardianship of Oleg, a kinsman. In 863 Oleg conquered Kiev, which was in possession of two Varangian chiefs, whom he

treacherously put to death, and, with a view to a descent on Constantinople, made it his capital. His preparations having been completed, about 904 he embarked on the Dnieper with 2000 boats and 80,000 men. The navigation of the river presented difficulties which were overcome by carrying the boats overland. On reaching Constantinople, the approach to which was barred by chains, the boats, it is said, were again landed, and converted into carriages by being placed on wheels. Leo VI was compelled to purchase the departure of the invaders. A formal treaty was subsequently dictated by Oleg to the emperor. He died in 913, when Igor, now thirty three years of age, succeeded to the vacant throne. A great part of his reign was passed in repressing revolts and subduing a new people, the Petchenegans, who had come from the Ural to settle on the Don and the Dnieper. In 941 he made an expedition against Constantinople with 10,000 boats and 400,000 men, but was completely defeated on sea and land by Theophanes and Phocas, the Greek admiral and general. The use of the Greek fire spread consternation in the Russian fleet. In 944 he repeated the attempt, but was bought off by a promise of the renewal of the tribute which had been paid to his predecessor. On his return (945) he was taken in an ambush and killed by the Drevlians, a tribe in the neighbourhood of Kiev which had been subdued by Oleg. His son Sviatoslaf was a minor, and the government devolved on his widow Olga, who has acquired the title of Saint, and was the first of the Russian name to merit canonization. According to Nestor, the Russian chronicler of the eleventh century (see NESTOR), she avenged her husband's death by cruel and treacherous massacres of the chiefs of the Drevlians, and by devastating their country, which she completely subdued. She appears to have resigned the government to her son about 955. About this time she became desirous of adopting the Christian religion, and paid a visit to Constantinople, where she was received with great distinction by the Emperor Constantine Porphyrogenitus, who stood sponsor for her in 957, when she was baptized by the name of Helen. She died in 969 according to Nestor, having endeavoured in vain to bring her son to her faith. Sviatoslaf is represented by Nestor as inuring himself to hardships, living in the open air among his soldiers, whom it was his sole object to exercise in the arts of war, and subsisting on the flesh of horses and wild animals. Having subdued the Kozares, a people who had crossed from the Caspian to the eastern shores of the Black Sea, he invaded Bulgaria at the instance of the Greek emperor Nicephorus, and captured the capital of the country, Pereislavatz, on the Danube (967). Here he determined to establish himself permanently, but was recalled by a rising of the Petchenegans, who had invaded Kiev. In 970 he divided his provinces among his three sons, and returned to pursue his eastern conquests. John Zimisceas, who had succeeded Nicephorus as emperor, jealous of the presence of the Russians in Bulgaria, summoned Sviatoslaf to evacuate the country. But the latter having collected an army of 300,000 Russians, Petchenegans, and Bulgarians, proceeded to invade Thrace. The campaign was attended with a succession of disasters, and unable to defend himself in Bulgaria, he returned home and fell in battle against his domestic enemies the Petchenegans (973). He was succeeded by his three sons, Yaropolk, the eldest, in Kiev, Oleg, the second, in the country of the Drevlians, and Vladimir, who was illegitimate, in Novgorod. Yaropolk attacked Oleg, whom he defeated and killed. Vladimir, fearing a similar fate, fled to the Varangians, and returning with succours made war on Yaropolk, got possession of his person during nego-

tiations, and put him to death (980). Yaropolk had been inclined towards Christianity, though he did not openly adopt it, and Vladimir was looked upon by the pagans as their champion. He is said to have had nearly as many concubines as Solomon, and to have shown his devotion to the gods by sacrificing his prisoners to them. He got rid of the Varangians, who wished to become his masters, by allowing them to go and offer their services to the emperor. He extended his dominions by conquest on every side, having pushed his arms westward into Poland and Galicia, eastward to the Volga, and from the Baltic on the north to the Crimea on the south. Being desirous of adopting Christianity, no doubt attracted by its attendant civilization, he invaded the Crimea and besieged Theodosia (Kaffa), to procure a priest to instruct him, although it seems probable he must have had many among his own subjects. He then sent a polite message to Basil II and Constantine, the joint emperors of the East, asking their sister Anna in marriage, and offering in the event of refusal to come and besiege Constantinople. His request was granted on condition of his becoming a Christian. He stated that this was his own intention, but he would not make it a condition of his marriage, and repeated his demand in a more peremptory manner. It was then thought expedient, although the Princess Anna was terribly frightened, to comply. The marriage was celebrated at Theodosia, where also Vladimir received baptism, under the name of Basil. He then gave orders for building a church at Theodosia, and restored the city its liberty. He also sent troops to Basil to enable him to subdue the rebel Phocas. According to the chronicles Vladimir now changed his mode of life so entirely as to earn the name of saint, to which the changes effected under his reign have induced historians to add the title of Great. In Russian history he occupies the position rather of Charlemagne than of Clovis. He exerted himself to promote the conversion of his people, built churches, endowed seminaries of learning, and abandoned his six wives and 800 concubines to devote himself to his Christian wife. With Christianity he introduced the germs of Greek civilization, gave the Russian language an alphabet, and enriched it with an infusion of Greek terms. Vladimir appears to have divided his dominions before his death among his sons, who at least had the charge of governments, although it is also said that he left the succession unsettled. What seems certain is that one of his sons, Yaroslav, had revolted towards the close of his reign, and that at his death several of his sons were left to fight for his dominions. He died in 1015. Sviatopolk, who succeeded to the Grand duchy of Kiev, is variously represented as the eldest son of Vladimir, and as a nephew whom he had adopted. To add to the difficulty of understanding how a nephew should be promoted to the chief place over a number of sons, Boris is represented as being the favourite son of Vladimir, so that Sviatopolk, if a nephew, was probably a usurper. It is also said (assuming him to be the eldest son), that having adopted the Roman Catholic faith (he married about the year 1000 the daughter of Boleslaw, king of Poland) he became an object of jealousy to his father, who imprisoned him till the close of his own life, and that he only owed the crown to the generosity of Boris, for whom it was intended. Whatever may be the truth of these stories it appears that one of his first acts was to assure his succession by putting to death Boris and Gleb, another son of Vladimir. He had next to contend for the supremacy with Yaroslav, who had obtained possession of Novgorod. He was at first successful, but being deserted by his father-in-law in consequence of his own bad

faith, he was vanquished, and died in exile. Yaroslav now succeeded (1019) to the greater part of his father's dominions. He was defeated in 1023 by Mstislaf, another son of Vladimir, of whom twelve are originally mentioned as having shared the inheritance. Being at the same time unsuccessful against the Poles he made peace with Mstislaf, and granted him an accession of territory. In 1031 Yaroslav recovered Red Russia, which had been seized by Poland, and in 1035, on the death of Mstislaf, he united the whole of the Russian dominions under his sway. In 1043 he sent an expedition, under the conduct of his sons, against the Greek Empire, which was not attended with success. Yaroslav was a zealous student and patron of literature. He established the metropolitan see of Kiev, and drew up the code of laws which is known as the Municipal Code of Novgorod.¹ Yaroslav died about 1054. With the example of his predecessor before him Yaroslav divided his dominions among his sons, and having taken this effectual mode of promoting civil war he exhorted them to live in peace and harmony with each other. The same mode of subdivision continued to prevail among his successors, and from this time till the middle of the fifteenth century Russia ceased to have a historical existence as a united state. It was during this period of confusion that Novgorod, then the greatest centre of commerce and the most opulent and powerful city of the north, acquired a sort of independence, and governed itself as a republic under the code of Yaroslav. As the process of subdivision proceeded the number of virtually independent principalities gradually increased, and the national life of Russia seemed to be wholly at an end, although a succession of grand princes of the house of Rurik continued to make war on and dispossess each other, and to form leagues and make wars with the neighbouring states. The nominal capital was successively changed from Kiev to Vladimir, and from Vladimir to Moscow. For a brief period under Vladimir II (1113-25) and his son Mstislaf (1125-32), upon whom the Russians have conferred the title of Great, the evils of division were averted by the wisdom and moderation of the rulers, but they broke out again on the death of the latter.

While Russia continued to degenerate under the calamity of domestic strife, another scourge was added to aggravate the misfortunes of the unhappy country. About 1223 the Tatar hordes of Genghis Khan, under the command of his sons, passed the Sea of Aral, and defeated the Circassians and the Polovtzes. A number of the latter took refuge at Kiev, and a confederacy of the Russian princes allied themselves with them to oppose the Tatars. The Tatars seem at first to have been unwilling to meet the Russians, but the Russian princes slew their ambassadors, and left them no alternative but war. The Russians were totally routed in a battle fought near the river Kalka, on the shores of the Sea of Azof. The Tatars at this time returned home without following up their advantage. Their disappearance was the signal for the renewal of civil war, and in 1230 a new calamity, the plague, desolated the country. 80,000 persons are said to have died at Smolensk, and 42,000 at Novgorod. About 1237 a new invasion of the Tatars, the celebrated Golden Horde, appeared under Batu Khan, a grandson of Genghis. These invaders overran the whole of Russia, and carried their arms into Poland, Galicia, and Hungary. They defeated and killed Yuri, prince of Vladimir, took and burned Moscow, and subdued the principalities of Kiev and Novgorod. The country

was laid waste wherever they came, the men were put to the sword, and the women reduced to captivity. The Tatars now established themselves in the country. They did not supersede the native princes, but reduced them to subjection, and compelled them to pay tribute, and to receive their nomination at the hands of the Tatar khan. During this period the divisions among the Russian princes contributed to render them the abject slaves of the Mogul conquerors. Every difference was referred to the khan, and on the slightest occasion the grand princes were summoned to appear at the court of the Tatar monarch, who exercised the power of life and death over them. The Tatars spread themselves over the whole south-east of Russia, extending from the shores of the Caspian and the Black Sea northward to Kazan, where they founded their last kingdom or khanate in 1441. They ultimately divided into five khanates, those of Kaptschak, Astrakhan, the Crimea, the Nogai Tatars, and Kazan. These divisions caused their ruin.

For more than two centuries Russia continued subject to the Tatars, while on its opposite frontier it was exposed to the attacks and encroachments of the Poles and Teutonic knights. Dmitri Ivanovich, surnamed Donskoi, who in the list of Russian sovereigns is called Demetrius III, a nominee of the Tatars, became the ruler of the principality at Moscow about 1363. The divisions which prosperity had produced among the Tatars had long since given the Russians the opportunity which their own divisions prevented them from embracing of throwing off the yoke. The predecessors of Dmitri had for some time been labouring to bring the other Russian princes to acknowledge them as their superiors, and he prosecuted this enterprise with success. To check his ambition the Tatar khan Mamai demanded from him an additional tribute, and summoned him to appear at his court. Dmitri refused, and had recourse to arms. A battle was fought on the southern banks of the Don, in which the Tatars were defeated, but returning with increased numbers under a new khan they besieged Moscow, and reduced the Russians again to submission. Ivan Vassilivich, named Ivan III, succeeded to the Moscow principality in 1462. He successfully attacked the Tatars, took Kazan, and after a long struggle, in which he allied himself with the Khan of the Crimea against the Khan of Kaptschak, who had for his ally the King of Poland, he put an end to the Tatar ascendancy, although their incursions continued for a long time to imperil the consolidation of the Russian state. Ivan also completed the work of his predecessors in reuniting the ancient dominions of Russia. He subdued Novgorod, abolished its municipal franchises, and confiscated the effects of the German merchants to whom it owed much of its prosperity. From this time the importance of the town began to decline. Ivan also invaded Livonia and Esthonia, but here he appears to have met with an effective resistance. Constantinople, the constant object of Russian ambition, was by these successes brought again within the scope of it. By his marriage at Rome in 1472, while his struggle with the Tatars was still in progress, with Sophia, grand daughter of Michael Palaiologus, he established a hereditary claim on behalf of the Russian princes to the imperial succession. The pope consented to this marriage with a view to uniting Russia to the Western Church, but this design it failed to accomplish. Ivan died in 1505. He had nominated as his successor his son Vassili, known as Vassili IV. His first war was an unsuccessful expedition against the Tatar prince of Kazan. He took Pskof, which had hitherto enjoyed an independence similar to that of Novgorod, and rivalled that city in commercial importance. He also engaged in several wars with Poland. During

¹ It was to Yaroslav that Voltaire applied the epigram, 'le due inconnu d'une Russie ignorée.'

his reign the Tatars made a great effort to recover their supremacy. The Tatars of the Kingdom of Kazan uniting with those of the Crimea raised an immense army, and after laying waste the eastern parts of Russia advanced to Moscow in 1521. Vassili was compelled to promise submission and renewal of tribute, and the enemy retired loaded with spoil and with 300,000 prisoners, whom they carried to Theodosia and sold to the Turks. Their departure was hastened by intelligence that the Tatars of Astrakhan had fallen upon those of the Kaptschack. Vassili subsequently made another expedition against Kazan, but was only partially successful. His army in fact was defeated, but so changed were the circumstances that the victorious khan hastened to acknowledge himself his tributary. Thus notwithstanding temporary disasters Vassili maintained the independence and extended in various directions the limits of his empire. He died in 1533. His son Ivan IV ascended the throne in his fourth year, and during his minority the country was a prey to anarchy. In his seventeenth year he assumed the reins of government with the title of *czar*¹. In 1552 he captured Kazan, and extended his conquests to the shores of the Caspian, and took possession of Astrakhan and the territory on the right of the Volga. Previous to this conquest he had sent an embassy to the Emperor Charles V, to request the assistance of German artists, mechanics, and literary men. Several hundred volunteers were collected, but most of them were intercepted on their journey through Livonia, and sent back again. Ivan now turned his arms against the Teutonic knights, whose sovereignty he put an end to in 1561, but they contrived to baulk him of his conquest, by putting their possessions under the protection of Poland and Sweden. Ivan was only able to secure Polotsk. Under his reign the conquest of Siberia was begun by the Don Cossacks, who made it over to the *czar*. Ivan had to struggle at once against the Poles, the Swedes, and the Tatars, by whom his dominions were invaded on all sides. A great invasion of the Tatars was defeated in 1571, but in the same year the Crimean Tatars defeated the Russians and burned Moscow. The Tatars again defeated him in 1584. Through the jealousies of his enemies he succeeded in making peace with Poland and Sweden in 1582. Taking advantage of the calamities of the country the inhabitants of Novgorod had endeavoured to recover their independence by putting their city under the protection of Poland. Ivan repaired thither in 1570, and for five weeks continued to put to death 500 or 600 of the citizens each day. Upwards of 25,000 are said to have perished. Similar cruelties were perpetrated by him in Livonia, Finland, and at Moscow, and he killed his eldest son with his own hand. By such deeds he earned the name of the Terrible. Yet the efforts of Ivan to civilize his people were constant, and his bursts of fury were frequently called forth by the resistance they encountered. He made a treaty of commerce with England, which led to the establishment in London of a company of Russian merchants. He published a code of laws early in his reign (1550), and he patronized art and learning, and introduced the art of printing into Russia. The first thirteen years of his reign were untroubled by the crimes which afterwards darkened it, and it seems as if political difficulties must have driven him mad. He died in 1584. Feodor, the eldest surviving son of Ivan, being unfit for the government of the empire, Ivan

had appointed a regency of three nobles, and committed to a fourth the charge of his younger son Dmitri. The three administrators did not agree among themselves, and could not control the other nobles, who were jealous of their appointment. The government fell entirely into the hands of Boris Gudonof, the brother in law and favourite of Feodor, who secretly aspired to the throne. He was of Tatar extraction, but a man of great wealth and influence. He appointed a creature of his own to the patriarchate, and had Dmitri removed and probably assassinated. Feodor died in 1598, not without suspicion of violence. Thus ended the dynasty of Rurik, which had reigned for a period of 700 years from the first formation of the Russian nationality. Although the collateral branches of the reigning family were not extinct, the majority of the nobles under the influence of the patriarch elected Boris *czar*. He proved on the whole an active and capable ruler, studying the improvement of the people, and promoting their prosperity by encouraging commerce, and inviting strangers to Russia with a view to open up the resources of the country. During his reign a severe famine occurred followed by a pestilence, which gave him an opportunity of acquiring confidence by his philanthropic exertions. But about the seventh year of his reign the first of a series of impostors, professing to be Dmitri, the youngest son of Ivan, appeared, and notwithstanding all that Boris had done to make himself popular, he met with general credence and support. With the aid of the Cossacks and the Poles the false Dmitri (see DERNERIUS) defeated an army sent against him by Boris, and advanced with a continuous accession to his supporters. In this extremity Boris is believed to have put an end to his own existence. He died in 1605. Feodor, his son, was deposed and sent to prison in favour of the false Dmitri, who caused him to be strangled. Dmitri was put to death in an insurrection of the nobles headed by Vassili Suski, who now assumed the reins of government. Another pretender, who was acknowledged by the widow of the late Dmitri, the daughter of the Palatine of Sandomir, as her husband, appeared to dispute the crown. The Swedes were called in to assist Vassili, and the Poles supported the second pseudo Dmitri. Eventually Dmitri was killed and Suski deposed. A period of anarchy now ensued, and the crown was offered by the nobles and clergy to Wladislaw, son of Sigismund, king of Poland, and other neighbouring princes. At length in 1613, through the influence of the clergy, who made it an indispensable condition that the sovereign should be of the orthodox faith, Michael Feodorovich, a scion of the house of Romanof, distantly related to the ancient reigning family, and whose head was metropolitan of Rostof, was chosen *czar*. Michael was compelled to purchase peace from Sweden and Poland by large cessions of territory. The government of Smolensk was ceded to the Poles, and Livonia and Esthonia, together with Ingria and Karelia, were given up to Sweden. The internal improvement of the country, by the consolidation of laws and the formation of commercial treaties, occupied most of his reign. He died in 1645. He was succeeded by his son Alexis, a minor, under the guardianship of a nobleman named Morosof. The administration of the regent caused disturbances which were with difficulty suppressed by the exertions of the *czar* and the metropolitan Nikon. The Cossacks, a remnant of the Tatar hordes, had put themselves under the protection of Poland, but the Polish clergy having endeavoured to force on them the Catholic religion they transferred their allegiance to Russia, which occasioned a war with Poland. Jealousy of the successes of Russia induced Sweden to join her enemies. A truce with Sweden,

¹ Ivan IV is commonly said to have been the first who took this title. It is, however otherwise stated that it was conferred by Alexis Comnenus on Vladimir II, and that the title *kayser*, as a German equivalent for *czar*, appears in a treaty between Vassili IV and the Emperor Maximilian.

which led to the establishment of peace, was concluded in 1658, and an armistice soon after concluded with Poland was renewed till the close of the reign of Alexis. The submission of the Cossacks of the Don in the meantime excited the jealousy of the Turks, who were, however, imprudent enough to unite the Poles and Russians by attacking them both. The early successes of the Turks were checked by the Polish general Sobieski (afterwards king), but the war between Russia and Turkey continued till the end of Alexis's reign. Alexis established a code of common or fundamental laws for Russia, by selecting from the ukases of his predecessors all those which had been current for 100 years, and which were consequently supposed to have commended themselves for their justice or expediency. Alexis died in 1676, leaving three sons, Feodor and Ivan by a first marriage, and Peter by a second, and six daughters. Feodor the eldest succeeded him. His brief reign was distinguished by two noteworthy occurrences. The war with the Turks was brought to a successful termination. Among the Russian nobility hereditary precedence of rank was a subject of endless disputes, which embroiled all the business of the state. A Russian noble hesitated to serve under a man whose pedigree was shorter than his own. Feodor ordered all the family registers to be brought to Moscow for examination, and having got them into his power he burned the whole of them. This excellent expedient appears to have been the act rather of a practical humourist than of a vigorous ruler. Had it been a mere display of despotic power it would probably have caused a civil war, but Feodor was popular with the nobility, and an encroachment on their private rights, which might have cost a stronger man dear, was allowed to pass with impunity. Feodor died in 1682. Ivan being of weak mind he had nominated Peter, who was still a minor, as his successor. His second sister Sophia, an ambitious woman, opposed this nomination. She was supported by the late Prime minister Galitzin and by the Strelitz, who raised an insurrection and proclaimed Ivan czar. The complete success of the conspiracy seems to have been frustrated mainly by Ivan himself, whose attachment to his brother Peter caused him to insist on his being proclaimed jointly with himself. Sophia was, however, appointed regent in the name of the joint czars, Peter being then ten years of age. Another insurrection of the Strelitz, which had nearly proved fatal to the reigning family, was excited by Prince Kovanskoï, to whose son Sophia had refused the hand of one of her sisters. Peter's party at length succeeded in removing Prince Galitzin from the head of the government, by persuading him to take the command of the army in a war with the Turks. They availed themselves of his absence to strengthen themselves, so that when Peter had attained his seventeenth year he was enabled to assume the reins of government, and his sister Sophia, who resisted this revolution, was relegated to a convent. Ivan was associated in the government until his death in 1697, but he took no part in public affairs, and Peter was virtually sole czar. His vast schemes and great personal efforts for the advancement of the empire and the improvement of his people are noticed in our biography of the great czar, we shall here merely summarize the leading political events of his reign. His first military achievement was his conquest of Azof from the Turks. His league with Poland and Denmark against Sweden, and his wars with Charles XII., have been noticed in the lives of both monarchs. The fatal battle of Poltava delivered Peter from all fear of his formidable rival, and enabled him to acquire at the expense of Sweden the great object of his ambition, a port on

the Baltic (See PETERSBURG, ST.), The war, which lasted eight years, found the Russian army unfit to cope with the regular troops of other European powers, and left them, though still inferior against equal numbers, comparatively disciplined and efficiently equipped, victorious and self confident. Had Charles, who equalled Peter in ambition and excelled him in aptitude for war, possessed a tithe of his political sagacity the result might have been different. The Treaty of Nystadt in 1721 secured from Sweden the cession of Livonia, Esthonia, Ingria, and part of Karelia, together with the territory of Vyborg, Oesel, and the other islands of the Baltic from Kurland to Vyborg, possessions towards the conquest of which the efforts of Russia had been directed for centuries, and even before her own independence was secured. Peter now assumed the title of emperor and autocrat of all the Russias. Every department of the state, the army, the legislature, the national religion and education, the administration of justice, was remodelled by Peter, and repeated allusions to the reforms introduced by him will be found in our notice of the present organization of the Russian empire. Peter's own conduct did not always harmonize with his great designs. Like all his predecessors who had attempted reform he found innumerable obstacles in the prejudices of his subjects, and the interests of the more powerful classes. In encountering these his energy sometimes took the form of violence, and though his excesses were mild in comparison with those of his great reforming predecessor Ivan IV., his public acts of tyranny were aggravated by vulgar personal tastes and low debauchery. Peter was in short the second barbarian who had attempted to civilize Russia, but the energy of his character made the attempt successful. He died in 1725. Of Catharine I., the second wife and successor of Peter, we have also given a biographical notice. Her brief reign, ended in 1727, was hailed by the Russians as a grateful relief from the exacting rigour of her husband's rule. She was succeeded by Peter II., grandson of Peter the Great, and son of the Czarovich Alexis (See АЛЕКСИЙ ПЕТРОВИЧ). Like his predecessor Peter was guided at first by the counsels of Prince Mentchikoff (See МЕНЧИКОВ). In a few months Mentchikoff was overthrown by a new aspirant to power, Dolgorouki, who with his family continued to influence Peter till his death in 1727. By the wills of Peter I. and Catharine, Peter II. should have been succeeded by the Duke of Holstein, Peter's grandson through his eldest daughter, but influenced by the Dolgoroukis the senate conferred the crown on Anne, second daughter of Ivan, Peter's elder brother. She broke through the restraints imposed on her by the Dolgoroukis, and asserting her sovereignty chose as her favourite Biren, whom she made Duke of Kurland. A war which broke out with Turkey in 1735 continued throughout the remainder of this reign. The Russians were assisted by the Austrians, and in several campaigns conducted by General Munnich gained considerable successes, but the final results of the war were inconsiderable. On the death of Anne (1740) Ivan, infant son of her niece, the Princess of Brunswick Wolfenbützel, and grandson of her elder sister, the Princess of Mecklenburg, was proclaimed her successor, and Biren was appointed regent. The unpopularity of Biren enabled the mother of the infant emperor to supersede him. Biren was sent to Siberia, and she herself assumed the regency. But another revolution broke out in 1741, which placed Elizabeth, daughter of Peter the Great and of Catharine, on the throne. Elizabeth was indolent, and intrusted the administration of affairs chiefly to her Chancellor Bestushef and to her favourites, with whom she lived on the most licentious terms.

A war with Sweden begun before her accession was terminated by the Peace of Abo in 1743. Through the influence of Great Britain Russia was induced to support Maria Theresa in the war of Succession. She also took an active part in the Seven Years' war, which lasted till the close of Elizabeth's reign (See ELIZABETH PETROWNA). She died 5th January, 1762. Her successor, Peter III., Charles Peter Ulric, son of the Duke of Holstein-Gottorp and of Anne, daughter of Peter the Great, had been invited to Russia by Elizabeth, as heir to the crown, in 1742, and had married at her instance in 1744, Sophia Augusta, daughter of Christian Augustus, prince of Anhalt-Zerbst, who on her baptism into the Greek Church took the name of Catharine. Peter's first and only important act was to make peace with Frederick II of Prussia. By injudicious attempts at reform he alienated his subjects, and especially the army, which he attempted to remodel on the Prussian system. Six months after his accession a sudden revolution, originating in domestic intrigue, and which owed its success to his own incapacity, hurled him from the throne, and placed on it his own wife, a German princess, unconnected with Russia save by her marriage with him. This revolution broke out on the 8th of July, on the 10th Peter signed his renunciation of the crown, and on the 17th he was put to death in prison. Catharine (see CATHARINE II) was a woman of great ability. She had been neglected for a mistress, and the sister of this mistress was her favourite and the chief instrument in placing her on the throne. Like all the females who had occupied the throne, she was licentious in her manners, and intrusted a large share in the administration of affairs to her personal favourites. She had a mind sufficiently powerful to take herself a leading part in their direction, but Potemkin, her chief favourite from 1776 to 1791, exercised a boundless sway over her (See POTESKIN). An insurrection having taken place in favour of Ivan VI., who was still in prison, he was put to death in 1764. Catharine secured the ascendancy of Russian councils in Poland, which was now hastening to its fall, by promoting the election of Stanislaus Poniatowski to the throne (See POLAND and PRUSSIA). A war with Turkey was begun in 1768, and concluded by the Peace of Kutchuk Kaimardji in 1774, which opened to Russia the navigation of the Black Sea, gave her the ports of Kertch, Yenikale, Kinburn, Taganrog, and Azof, and compelled the Porte to recognize the independence of the Tatars of Kuban and the Crimea, an intermediate step to their annexation by Russia, and in 1783 the Crimea was formally taken possession of. In 1772 the first treaty for the partition of Poland was concluded with Prussia and Austria. In 1780 the Russian cabinet, though generally favourable to England, issued a declaration on the right of neutrals, which led to the armed neutrality among the northern powers to resist the right of search claimed by England. War was renewed with Turkey in 1787, and war was declared with Sweden in 1788. Austria joined in the war with the Porte, and Prussia allied itself with that power, offered mediation, and made extensive preparations for war, while Great Britain made a formal declaration to Russia in 1791, that she would demand for the Porte the *status quo ante bellum*. In these circumstances Russia accepted the mediation of Denmark. The Peace of Jassy was signed on 9th January, 1792. The basis of the peace was a modified *status quo*, and the Dniester was established as the boundary between the Russian and Turkish Empires. Peace with Sweden was concluded on the *status quo* in 1790. The progress of the French revolution afterwards made Catharine

a close ally of Sweden and England. In conjunction with Prussia a further partition of Poland took place in 1793, and a third in 1795. In this year also Catharine annexed the Duchy of Kurland. She died 17th November, 1796. She was succeeded by her son Paul, who, although he had attained his forty-second year, had never been allowed to participate in public affairs (See PAUL I.). It is even said that his mother, aware of his incapacity, had intended to supersede him in the succession. His first act was one of vengeance on the murderers of his father, who were compelled to assist in a pompous funeral of the late czar, and then disgraced. Peter was buried beside his consort. Catharine had invaded the Persian territories on the Caspian in the last year of her reign, but Paul put an end to this war. In 1799 he joined the second coalition against France, and sent armies into Switzerland and Italy under Korsakof and Suvarof. He also entered into an alliance, offensive and defensive, with Turkey. In 1800, his armies having sustained some reverses, which he attributed to want of co-operation on the part of the other powers, he suddenly withdrew from the alliance. Great Britain having offended him by the occupation of Malta, of which he had accepted the dignity of grand master, he revived the armed neutrality, and entered into friendly relations with Napoleon. At the close of this year all Europe was startled with the revelation of a fact which many arbitrary and frivolous acts had already made manifest to his own subjects, that the czar was of unsound mind. A proclamation was issued in his name, which appears to have been written by his own hand, challenging the sovereigns of Europe to meet and settle their differences by personal combat. The Hamburg Gazette, which contained the original intimation of this challenge, concludes with the following curious sentence, which formed part of the original communication in the handwriting of the czar — 'We do not know if this report be worthy of credit, however, the thing appears not destitute of some foundation, and bears strong marks of what he has often been taxed with.' The situation of Russia, with an absolute ruler of an arbitrary temper, and incapable of rationally controlling his own acts, was sufficiently alarming, and a desperate expedient was resorted to to deliver it from the danger. Count Pahlen, the governor of St Petersburg, and Count Zuboff, the last favourite of Catharine, with their friends, determined that the czar must die. On the night of 24th March, 1801, the conspirators entered the sleeping apartment of the czar in the new palace of St Michael, and in spite of his entreaties and resistance strangled him with the sash of one of the party. The only notice which Alexander I., the son and successor of Paul, took of this dreadful act was to remove the governor of St Petersburg from his official position, and forbid the other conspirators to appear at his court. There is no reason to suppose that Alexander connived at his father's death, but the extremity of the circumstances doubtless made him unwilling to deal out the ordinary measure of justice to the assassins. Alexander cultivated the friendship of Great Britain, and abandoned the claim on Malta, which had been the main cause of dissension between that power and the late czar. He also endeavoured to maintain peace with France, and entered into a treaty of commerce with Sweden. The internal policy of Alexander, his efforts to promote commerce and education, to improve the administration of justice, to abolish serfdom, are noticed in our biographical sketch. The most eventful period of his reign, from 1805, when he joined the alliance against Napoleon, till the overthrow of the French Empire in 1814–15, is matter of European

history, and requires no summary here, having already been dealt with in the history of France. The only incidents of this period that need be mentioned are that during the temporary alliance of Alexander with Napoleon Finland was conquered from Sweden in 1808, and that while the European drama was approaching its crisis Russia was engaged in carrying on a war with Turkey, which began in February, 1809, and concluded by a treaty signed at Bucharest, 28th May, 1812. This war was the result of the cession of Moldavia and Wallachia, made by Napoleon to Alexander in 1808. The Treaty of Bucharest provided for the cession of Bessarabia to Russia, and the Pruth became the boundary between the Ottoman and the Russian Empires. During the greater part of this period Alexander was in close alliance with Great Britain, and the enlightened policy of the early part of his reign, as well as the common object so long pursued, undoubtedly formed a bond of sympathy between the freedom-loving people of this country and the autocratic czar, which gave rise to illusory hopes of future concord. But the alliance of the sovereigns of Europe against Napoleon was an accidental combination which implied no community of principles except the common dread of anarchy or foreign tyranny. Among the continental powers the assertion of the principle of hereditary monarchy was, next to the preservation of their own dominions, the predominant motive, while the zeal of the most persevering of the enemies of the Revolution and Napoleon was stimulated by the dread of seeing human progress swamped in revolutionary anarchy or buried under the weight of an irresistible despotism. Alexander, notwithstanding his solicitude for internal reforms, was the representative of the European sovereigns, who regarded absolute monarchy as the only bulwark against the excesses of democracy. The calamities entailed on his own and other European countries by French aggression seem also to have somewhat damped his early zeal for liberal measures, so that on the return of peace it became apparent that there was a wide divergence between the views of England and those of the other allies, and that the pursuit of a common policy with Russia in particular was further from the grasp of British statesmanship than it had ever been known to be in the period before the revolution. For this there were two leading reasons. Alexander was the originator and chief promoter of the Holy Alliance, a league of sovereigns for the maintenance of despotism, which was viewed with as much disfavour by all classes in England as by the democrats of France themselves. The steadfast support which Alexander gave during the remainder of his life to the principles of the Holy Alliance alienated England from Russia in questions of European policy. Previous to the Revolution, moreover, England and Russia had severally entered upon courses of development which were rapidly bringing them into rivalry and antagonism with each other. Although removed from each other in the sphere of European politics, and having little to disturb their common interest in the maintenance of peace and the pursuit of trade, which was hardly a more constant object of British than of Russian policy, their respective conquests had thrown them upon each other's path in the East, and embroiled their relations in the arena of Asiatic diplomacy. The conquests of England in India had originated fortuitously in the course of her commercial pursuits. Her route to them lay through the ocean, and necessitated the command of intermediate ports. Hence a special jealousy of the encroachments of any powerful state on the seaboard of Southern Europe. But Russia had also her eastern conquests. From the time of

her independence she had annexed a large portion of Northern Asia, and brought herself into contact with China and Persia. She had already entered the system of Asiatic politics, and her continental approaches threatened us with a formidable neighbour, who could bring up his forces by land to a base of operations in close proximity to our own frontiers. In pursuing the natural and traditional policy of Russia, Alexander thus brought himself into antagonism with the eastern policy of England. The latter part of his reign is specially distinguished by the growth of this antagonism. It was then that England began systematically to assume the position of guardian and protector of the declining Turkish Empire, as a bulwark against the encroachments of Russian ambition, and that it became a fixed maxim of British policy that Constantinople must never fall into the hands of Russia. As a natural result of this inevitable rivalry, the schemes of Russia have been subject in this country to a good deal of misrepresentation, her aggressive tendencies have been exaggerated, her ambition has been judged to be more unscrupulous, and her claims to be less reasonable than would have been the case had her situation been our own. While we have extended our dominion in India because our commercial settlements were surrounded by peoples less civilized than ourselves, we make little account of the fact that the home territories of Russia are similarly surrounded, and we never allow ourselves to think that the conquest of Constantinople and the subjugation of the Turkish Empire by Russia would probably be beneficial to the inhabitants of these regions themselves, and would most likely do no harm to anybody else. Even the fact that the Russian emperors have a hereditary claim on Constantinople would probably seem much more significant to us if we were in Russia, but on a point which more immediately concerns our policy we are perhaps equally partial. If, as far as our interference is concerned, we should allow the ambition of Russia to have free course, it seems very doubtful if we would be in any worse position to defend our own possessions against her. We probably do not allow sufficient weight to the circumstance that the nearer Russia approaches to our Indian frontier the further she moves from the centre of her own resources, and that the immense distance over which she would have to transport the men and material by land for an aggressive movement on India would in a protracted struggle more than compensate for our being confined to a communication by water. The policy of Alexander after the peace of 1815 was, as has been indicated, chiefly directed towards weakening Turkey and strengthening the position of Russia in the East. Alexander died on 1st December, 1825. Among the measures of his reign that of military colonies, adopted in 1819 in order to reduce the expense of a standing army, deserves a passing notice, although it has not been found efficacious, and has been abandoned by his successors. Alexander died without issue. His elder brother Constantine, whose temper was supposed to render him unfit to reign, having in 1822 signed a deed of resignation of the crown, his second brother Nicholas succeeded him under the title of Nicholas I. The leading events of his reign are summarized in our biography (See NICHOLAS I.) For the most important of them, the Crimean war, see CRIMEA. Nicholas died on 2d March, 1855. He was succeeded by his son Alexander II. The Crimean war was concluded by the Treaty of Paris, signed 30th March, 1856. Its terms will be found in our article on the war. Alexander's first cares were given to the reformation of justice and education. He made at first some concessions to Polish nationality, though

with the firm intention of maintaining the unity of the empire, but after several insurrections Poland was finally incorporated with Russia in 1868. An other great measure concluded during this reign, the emancipation of the serfs, by which nearly 45,000,000 of men were delivered from hereditary bondage, was perhaps the vastest act of philanthropy which it ever fell to the lot of an individual man to accomplish (See section Tenure of Land, &c.) Russia in recent times has taken an active part in European politics, but her chief efforts have been directed towards the East. For some time her progress in this direction was arrested by the results of the Crimean war, but the Caucasian tribes were subdued in 1864, and a war with Bokhara, begun in 1866, ended in 1868 with the conquest of Samarkand. During the Franco-German war Russia seized the opportunity of the isolation of Great Britain to denounce those articles of the Treaty of Paris which prohibited her from fortifying Sebastopol and maintaining an armed fleet on the Black Sea. On the remonstrance of several of the European powers a conference was held in London, which led to a treaty abrogating the Black Sea clauses, signed 13th March, 1871. In 1873 an expedition was sent against the Khan of Khiva, which resulted in the annexation to Russia of a considerable portion of the Khivan territory. In 1877 war arose with Turkey as one of the remote consequences of the insurrection in Herzegovina that began in the summer of 1875. This insurrection brought to light the continued misgovernment by Turkey of her Christian subjects, and other risings having followed, Russia, acting as champion of the Christian provinces of Turkey, crossed the Turkish frontier on the 24th of April, 1877. The war ended early in 1878 with the complete overthrow of Turkey, and on the 3rd of March a treaty of peace was signed before the gates of Constantinople at San Stefano, the arrangements made by it being subsequently modified by the Berlin treaty of July following. The result was that Russia obtained Kars and part of Armenia, as also the part of Bessarabia of which she had been deprived by the Crimean War. Since the conclusion of this war Russia has been more than ever disturbed by the Nihilists, who after various attempts at assassination, including an attempt to blow up the whole imperial party in the winter palace in 1880, succeeded in killing the Emperor Alexander by means of a bomb in St. Petersburg, March 13, 1881. His successor was his son Alexander III., under whom the possessions of Russia beyond the Caspian were extended by the defeat of the Tekke Turcomans, and the annexation of Merv and other territory. The Russian advances towards Afghanistan caused considerable friction between Russia and Britain, threatening to result in war. In the winter of 1891-92 famine raged in some provinces. Alexander III. died in 1894, and was succeeded by his son Nicholas II. In 1898 Nicholas II. issued a proposal for a peace conference to all the important states of the world. The conference was held at the Hague in 1899, and was attended by representatives of twenty-six powers. Several important conventions on arbitration and other matters were drawn up after discussion and signed by the plenipotentiaries. See HAGUE CONFERENCE.

RUSSIA LEATHER is prepared in Russia chiefly from cow-hides, and is highly estimated for its flexibility, durability, and imperviousness to water. This leather is much used for book binding, and for making various fancy articles.

RUSSNIAKS See **RUTHENIANS**.

RUST, peroxide of iron, formed by the gradual oxidation of iron when exposed to the air. See **IRON**.

RUST, the popular name of certain diseases of

plants due to parasitic fungi, especially those produced by fungi of the family Uredineæ in the order Basidiomycetes. The spores of the fungi appear as yellow or brown spots on the leaves of the plants attacked. Many of these rust fungi appear under three different forms, and in not a few cases these three stages in their life history are passed on different host plants. The best known example is the rust of wheat, due to the fungus known as *Puccinia graminis*. The spores of the *Puccinia* remain dormant throughout the winter, and in spring produce conidia, which can germinate only on the leaves of the barberry, where they form yellow spots. These spores, on being carried to the leaves of wheat plants, germinate, producing a third stage of the plant, from which the *Puccinia* is ultimately developed again. The barberry stage was formerly treated as a separate fungus under the name *Aecidium berberidis*, and the spores of this stage are still known as aecidiospores. The first kind of spores developed on the wheat leaves was formerly regarded as a fungus of the genus *Uredo*, and these spores are still known as uredospores. The third stage is that of the teliospores, and the name formerly applied to it is now extended to the fungus throughout its life history. Another wheat rust, most commonly seen in the uredo stage is *Puccinia rubigo vera*. The aecidiospores are developed on plants of the order Boraginaceæ. No remedy is known for wheat rust beyond the extirpation of the barberry or other plant on which the aecidiospores develop.

RUSTCHUK, a town of Bulgaria, on the right bank of the Danube, where that river is joined by the Lom, opposite Giurgevo, and 42 miles south by west of Bucharest. It has some woollen, silk, and other manufactures, and considerable trade. It was nearly destroyed by the Russian bombardment in the war of 1877-78. Pop. (1900), 32,661.

RUSTIC WORK, in building masonry worked with grooves between the courses, to look like open joints.

RUTH, Book of. The date of the little history contained in this book cannot be precisely fixed. Who the writer of the book was is also unknown. Some have ascribed it to Samuel, others have placed it as late as the Babylonish captivity, whilst several of the best modern scholars regard it as post exilic. On the one hand, the style of the narrative connects it with the period when the Hebrew language and literature were still in full vigour and freshness, not with the period of their decay. On the other hand, it is evident that it cannot be placed earlier than the time of the kings, first, from the way in which the judges are mentioned in chap. i. 1, secondly, from the change in the customs of the people that must have taken place between the date of the events and that of the narrative that records them (chap. iv. 7), and thirdly, from the mention of the name of David. In the Hebrew Bible the Book of Ruth now stands among the Hagiographa immediately after the Song of Solomon as one of the five Megilloth, or sacred rolls, read on occasion of the principal Jewish solemnities. But there can be no doubt that originally in the Hebrew Scriptures as in the Septuagint and in the English Bible, it followed the Book of Judges, and was sometimes even reckoned part of it.

RUTHENIANS, **RUSNIAKS**, or **RED RUSSIANS**, Slavonic tribes inhabiting eastern Galicia, Bukovina, and north eastern Hungary. The number of Ruthenians in the Austrian Empire amounts to 3,000,000, of whom about 500,000 are settled in Hungary. Very few can read or write. Their dwellings are wretched huts of boards and mud. Superstition is very rife. In the popular songs, which have a close connection with those of

the other Slavonic nations, there is a prevalent strain of sadness both in the words and in the melodies. The occupations of the people are pasturage, agriculture, and carrying (by means of conveyances drawn by animals). Of manufacturing industry there is no trace. The towns are inhabited by Poles and Jews, the nobility are Polonized. The Ruthenians belong for the most part to the United Greek Church, and pay a blind obedience to their clergy. They are bitterly hostile to the Poles, and latterly their efforts have been directed to the separation of Galicia into a Polish kingdom in the west and a Ruthenian in the east. They have likewise begun to attach themselves in their literature to Russia, allowing the Ruthenian dialect to drop out of existence as a literary tongue. The name they give to themselves is Russians, and they call their country Rus.

RUTHENIUM, a metal belonging to the platinum group. It has the atomic weight 101.7, and the symbol Ru. Some specimens of platinum ore contain from 3 to 6 per cent of ruthenium. It is a whitish gray metal, having a specific gravity of 11 to 11.4, it is very infusible—more so, indeed, than any other metal except osmium, is scarcely attacked by nitromuriatic acid, but is more easily oxidized by fusion with nitre, chlorate of potassium, &c., than platinum. Ruthenium forms a series of salts which are analogous to those of platinum.

RUTHERFORD, SAMUEL, an eminent Scottish divine, was born about the year 1600 in Roxburghshire. He studied at Edinburgh College, took his degree of M.A. in 1621, and in 1627 was appointed minister of Anwoth, in Kirkcudbright. Here he devoted himself with the utmost assiduity to the duties of his pastoral charge. His strong Presbyterian views, however, rendered him obnoxious to the church and state authorities, and in 1636 he was deprived of his office, and afterwards sentenced by the High-commission at Edinburgh to confine himself, during the king's pleasure, within the town of Aberdeen. The rash attempt of Charles I. to force Episcopacy upon the Scottish people, and the consequent triumph of Presbytery, enabled Rutherford in February, 1638, to return to his parish of Anwoth, and he afterwards took a prominent part in the drawing up of the National Covenant, and the subsequent proceedings of the church. In 1639 he was appointed one of the ministers of St Andrews, and professor of divinity in the new college there, where he resided for the remainder of his life. He acted as one of the commissioners from the Scottish Church to the assembly of divines at Westminster, and was in 1649 made principal of the new college, St Andrews. He published numerous politico-theological treatises, which are greatly admired for the lucidity, vigour, and learning which they display. The most famous of these is *Lex Rex*, a reply to a work by the Bishop of Ross. In 1651 he was formally elected professor of divinity in the University of Utrecht, but declined to accept the appointment. On the Restoration his book of *Lex Rex* was publicly burned, and he himself was deprived of office, confined to his own house, and summoned to answer a charge of high treason at the next session of Parliament. Before Parliament met, however, he was beyond the reach of his enemies, having died on 20th March, 1661. His Familiar Letters, published after his death, are distinguished by their fervour and imaginative power, and have been frequently reprinted.

RUTHERGLEN, commonly called **RUGLEN**, an ancient royal and a parliamentary and municipal burgh in Scotland, in the county of Lanark, 2 miles south-east of Glasgow, on the left bank of the Clyde. It consists chiefly of one spacious street, extending

east and west, with numerous other streets branching north and south. In the Main Street stands a fine baronial structure, the municipal buildings and town hall, with a magnificent tower. There are several churches and board schools, chemical works, dye works, a paper mill, a pottery, and a boat building yard, and in the vicinity several coal-mines. Rutherglen was erected into a royal burgh by David I. about 1126, and at that time included Glasgow within its boundaries. It was in ancient times an important place, with a large traffic on the river, but both its consequence and its trade have been absorbed by Glasgow. It belongs to the Kilmarnock district of parliamentary burghs. Pop (royal burgh) in 1881, 11,473, in 1891, 13,961, in 1901, 18,250.

RUTHIN, RHUDDIN, or RHUTHYN a municipal and parliamentary borough and market town in North Wales, beautifully situated on the Clwyd, in the county of Denbigh, 7 miles S.E. of the town of Denbigh. It has a fine county hall, with offices, a town hall, and the county prison, grammar school, county girls' school, hospital for aged persons, and other valuable charities, &c. Near it are the remains of a magnificent old castle called Rhyddin, or Red Fortress, from the red stone used in its construction, now incorporated with a modern Gothic castellated edifice. The chief trade is in agricultural produce, but there is also some trade in stone and other building materials. The only manufacture is that of aerated waters. Ruthin is one of the Denbigh parli. boroughs. Pop (1891), 2760, (1901), 2641.

RUTHVEN, RAID, or, in Scottish history, an act of violence by which the Duke of Lennox and Earl of Arran, the favourites of James VI., were deprived of their influence with that sovereign. On the 22d of August, 1582, the king had come on a hunting expedition to the castle of Ruthven, the seat of the Earl of Gowrie, a few miles north of Perth. The next morning the king saw the castle surrounded by 1000 armed men, and found himself in the power of the Earl of Gowrie, the Earl of Mar, the Master of Glamis, Lord Lindsay of the Byres, and some other noblemen. The Earl of Arran, who came to pay his court to the king, was arrested. The Duke of Lennox, who was then at a distance, was compelled to take refuge in remote districts of the country, and ultimately to leave the kingdom. He died in France in the following year. The conspirators of Ruthven did not, however, put any constraint on the actions of the king himself. He was allowed to go where he pleased, and they were content with keeping the power in their own hands by following him about with their retainers as a guard of honour. In this way they maintained themselves for ten months, when they were deprived of power by a *coup d'état* similar to that by which they had gained it. Gowrie and his adherents were unable to keep their retainers together for so long a period, and had besides grown rather negligent, so that on the 29th of June, 1583, Huntly, Marischal, Argyle, and some other leaders of an opposite party, were able to surround the king at St Andrews with a body of troops that outmatched the body guard of the Ruthven party, which was thus overthrown. The Earl of Arran soon regained his supremacy, and in spite of the fact that the royal pardon was granted to the leaders in the raid of Ruthven, managed to have the Earl of Gowrie beheaded in the following year.

RUTLAND, or RUTLANDSHIRE, the smallest of the English counties, surrounded by the counties of Lincoln, Leicester, and Northampton. Area, 97,273 acres, of which about nine tenths are under crops or in meadow and pasture. The principal crops are wheat and barley. The surface is beautifully diversified by gently rising hills, with fine valleys between

It is included in the district occupied by the lower formations of the oolitic series, the prevailing rock is a close grained limestone, but there are quarries of good building stone, and limestone, both soft and hard, is found in many parts. The soil is almost everywhere loamy and rich. The west part of the county is under grass, and the east chiefly in tillage. Great attention has been paid here to rearing choice animals, both oxen and sheep. For the last it is celebrated, as also for its wheat and cheese, much of the latter being sold as Stilton. There are nearly 3000 acres of native woods and plantations in the county, but the extensive woodlands for which it was formerly distinguished are now greatly reduced. It returns one member to the House of Commons. Pop (1891), 20,659, (1901), 19,708.

RUYSDAEL, or **RUISDAEL**, **JACOB VAN**, a great Dutch landscape painter, was born at Haarlem in 1628. He was the son of a painter, and probably studied art under his father and an uncle who was also a painter. In 1648 he entered the guild of his native city, and some nine years later he settled in Amsterdam, where he received citizen rights in 1659. He appears to have travelled throughout his native country and in parts of Germany and Switzerland. He returned to Haarlem in 1681, broken down in health and fortune, and by the aid of some Mennonite friends he was received into an almshouse, where he died in 1682. Ruysdael was not much appreciated during his lifetime, but he is now ranked among the greatest of the Dutch painters of landscape. His pictures, comprising well chosen forest, waterfalls, shore, mountain, and similar scenes, are often of a melancholy, but always of a deeply poetical character. The figures in them were painted by Berchem, Van de Velde, Van Ostade, Wouwerman, Lingelbach, and others. All the chief European galleries contain examples of his work, the number in the National Gallery being twelve. He was also a good etcher. Hobbema is said to have been his pupil. See Michel's *Jacob van Ruysdael et les Paysagistes de L'École de Harlem* (1890).

RUYTEK, **MICHAEL ADRIAANSZON**, a celebrated Dutch admiral born at Flushing in 1607. He entered young into the naval service of his country, and rose from the situation of cabin boy to that of captain (in 1635). In 1641 he was placed, with the rank of rear admiral, in command of a fleet that was sent to the assistance of the Portuguese, who had thrown off the yoke of Spain, and he was afterwards employed against the Barbary corsairs. In the war between the Dutch and English, which commenced in 1652, Ruyter repeatedly distinguished himself, especially in the terrible battle fought in Feb. 1653, near the mouth of the Channel, in which Blake, commanding the English, defeated Tromp and Ruyter, who commanded the Dutch. He afterwards served against the Portuguese, the Swedes, and the Algerines previously to the naval warfare between England and Holland in the reign of Charles II. He commanded in the great battle fought in the Downs in June, 1666, against Prince Rupert and the Duke of Albemarle (see *MONK*), and in the following year he insulted the English by his memorable expedition up the Thames, when he destroyed Upnor Castle and burned some ships at Sheerness. He was admiral of the Dutch fleet at the battle of Solebay (Southwold Bay) in 1672, when the Dutch were defeated by the English under the Duke of York, but in the following year he gained a victory over the combined English and French fleets. He died at Syracuse, April 29, 1676, in consequence of a wound received in an engagement with the French a few days before off Messina. His body was carried to Amsterdam, where the states general erected

a monument to his memory. See *Life* by Milne (1897).

RYBINSK, or **RUBINSK**, a town in Russia, in the government of Jaroslav, and 52 miles W N W of the town of Jaroslav, on the Volga, at the confluence of the Rybinska. It has manufactures of linen, spinning mills, several tanneries, tallow melting establishments, and an important trade in grain. Pop (1893) 29,275.

RYDE, a municipal borough and watering place of England, in the Isle of Wight, finely situated on the Spithead shore, 7 miles E N E of Newport. It is regularly laid out on a sloping site, and has an esplanade, a pier of great length with electric tramway, and good bathing facilities. Its buildings and institutions include the splendid church of All Saints, erected in 1870 from designs by Sir G. G. Scott, other Established churches, a Roman Catholic church, and Nonconformist chapels, the town hall, a classic building, the Royal Victoria Yacht Club House, school of art, Royal Victoria Arcade, literary institute (Y M C A), temperance hall, recreation courts, theatre, infirmary, almshouses, &c. There is regular communication by steamboat at frequent intervals with Portsmouth, Portsea, Southsea, &c. Pop (1891), 10,952, (1901), 11,042.

RYE (*Secale cereale*, natural order Gramineae), a species of grain, from 4 to 6 feet high, with a fibrous annual root, producing one or several slender culms, which are provided at their articulations with linear and smooth leaves. The flowers are greenish disposed in a terminal simple spike 4 or 5 inches in length. The cultivated species, which is of more recent origin than the other cereals, is supposed to have been derived from the *S. montanum* of south east Europe and western Asia. Of all domestic plants it has been the last altered by cultivation, and no permanent variety has been produced. Rye succeeds better in cold climates than wheat, grows in a greater variety of soils, resists severe frosts better, and arrives at maturity sooner. All soils will produce rye, provided they are not too moist, and many barren lands, which are unsuitable for the cultivation of wheat, may be sown with this grain to advantage. It does not require so much attention during its growth as wheat, and the ripening varies, according as the season is more or less warm and favourable, from the first of July to the last of the month, but in general it precedes wheat by fifteen or twenty days. In some countries it is customary to sow in March, but it rarely produces so well as when sown before the setting in of the winter. Where it is cultivated in this country at all it is for the most part only for green fodder for sheep. Rye is the principal bread stuff in the greater part of the north of Europe, and, after wheat, nourishes the greatest portion of the population of that continent. Even in more than half of France rye-bread, either pure or mixed with wheat in equal proportions, is the only kind to be procured. When cultivated for green fodder the crop, both on account of the sheep manure and of the roots ploughed in, improves the soil, while as a grain crop it is an exhauster of the soil. Rye bread is not so nutritious as wheat, but has more flavour. In the north the greater part of the ardent spirits is distilled from rye. The straw is long, flexible, and does not rot so easily as that of other grain, it is used by brick makers and horse collar manufacturers, and is considered an excellent material for the thatching of cottages and barns. Rye is subject to a disease called ergot which renders it dangerous for food. See *ERGOT*.

RYE, a municipal, and, previous to 1885, a parliamentary borough of England, in Sussex, one of the Cinque Ports. It is situated 64 miles S S E

from London by the South Eastern Railway, on an eminence at the mouth of the river Rother. Besides iron and chemical works, brewing and ship building are carried on, and there is a trade in corn, coal, hops, oak bark, timber, and wool, the herring and mackerel fisheries afford profitable employment. Rye is a place of great antiquity, and was formerly surrounded with walls, one of the gate houses of which still remains. Pop (1881), of mun bor, 4224, in 1891, 3871, in 1901, 3900.

RYE GRASS, the common name of a number of grasses belonging to the genus *Lolium*, which presents the botanical anomaly of associating the most important herbage and forage grasses with the most pernicious weeds of agriculture. These grasses are readily known by the many flowered sessile spikelets, arranged edgewise and alternately upon a zigzag rachis, and supported by a single herbaceous glume arising from the base and pressing against the outer edge. Occasionally a second rudimentary glume interposes between the spikelets and the rachis. The principal of the useful species are the *Lolium perenne* and the *Lolium Italicum* or Italian Rye grass. The former is a native of Great Britain, where it is largely cultivated, being found especially useful in light land. Its roots are perennial, yet the plant does not appear to be of long duration, generally dying off by the third year. Its spikelets are much longer than the glume. Italian Rye grass, as its name implies, is a native of the south of Europe. It differs from the former in its more vigorous growth, and in its bearded spikelets, which are shorter than the glumes. The whole plant is of a lighter colour it grows more erect, and is hardly more than a biennial under ordinary circumstances. In the plain of Lombardy, where this kind of grass is largely grown and regularly irrigated, it is said to have been cut eight times in a year. It now forms an important part of the best English agriculture. The pernicious varieties of rye grass are the *L. temulentum*, or Common Darnel, and its allies. (See **DARNEL**) *Arrhenatherum arvense* is called French rye grass.

RYE HOUSE PLOT, in English history, a conspiracy which took place in the reign of Charles II., and which became famous from the fact that its detection involved the death of Lord William Russell, Lord Essex, and Algernon Sidney, who were in no way connected with it. The immediate object of the Rye house Plot, which was contrived in 1683 among a number of obscure persons belonging to the party of which those celebrated men were among the leaders, was to assassinate the king and his brother, the Duke of York (afterwards James II.), as they returned from the Newmarket races. This plan was to have been executed at a convenient spot on the road from Newmarket to London, where there was a farm called Rye house, belonging to one of the conspirators name Rumboldt, but the plan was frustrated by the king and his brother happening to return from Newmarket earlier than was expected. Soon after information of the matter was laid before one of the secretaries of state, and it was added that since this plot had been frustrated the plan of a general insurrection had been taken up by various eminent persons, among whom were those mentioned. A general insurrection had indeed been talked of among the accused persons, and the details and probable success of such a scheme appear to have been considered by them, but there was no evidence whatever to show that the promoters of the wider scheme were in any way involved in the minor plot, which was got up, after the general insurrection had first been talked of, by a few of those who were already concerned in the larger plan. Yet from the way in which the revelations were made to the government

the two schemes were completely confounded, and Russell, Essex, and Sidney were arrested on the charge of treason. Essex put an end to his own life in the Tower, and Russell and Sidney were condemned and beheaded. Lieutenant colonel Walcott, one of the real contrivers of the Rye house Plot, was at the same time brought to the block.

RYMER, THOMAS, of Erceldoune. See **RHYMER** (THOMAS THE).

RYMER, THOMAS, a critic and antiquary, born at Yafforth, Yorkshire, in 1641, studied at Sidney Sussex College, Cambridge, and at Gray's Inn, being called to the bar in 1673. In 1678 he published *Edgar, a Tragedy*, and a work entitled *The Tragedies of the Last Age*, considered and examined by the Practice of the Ancients. In 1692 he succeeded Shadwell as royal historiographer, and in this capacity he was intrusted with the preparation of a collection of public treaties, which he began to publish in 1704, under the title of *Fœdera, Conventiones, et cujus cunque Generis Acta publica inter Reges Angliæ et alios Principes*. Of this work he completed fifteen volumes, and five more were afterwards added by Robert Sanderson. The publication of the whole work was finished in 1735. Rymer died in London on Dec. 14, 1713. In 1869-85 Sir T. D. Hardy issued a valuable syllabus of the *Fœdera*, containing many corrections.

RYOTWAR in India, the lease of land by the government officers to the ryots or native cultivators at a fixed rent, a practice chiefly prevalent in the Madras Presidency. See **INDIA**—*Land Revenue and Land Settlement*.

RYSBRACK, JOHN MICHAEL, a statuary, was the son of a painter of Antwerp, in which city he was born in 1693 or 1694. He went to England in 1720, and derived considerable reputation and profit from the exercise of his art, of which Westminster Abbey and other cathedral churches contain specimens, among which may be mentioned the monuments of Sir Isaac Newton and the Duke of Marlborough. He was also the sculptor of an equestrian statue of William III., erected at Bristol, and of a statue of Locke at Oxford. His death took place on Jan. 8, 1770.

RYSWICK (*Ryswyck*), a village and castle of the Netherlands, in the province of South Holland, about 3 miles south east of the Hague, where the Peace of Ryswick, which terminated the war waged against Louis XIV. by a league consisting of Holland, the German Empire, Britain, Spain, and Savoy, was signed (September 20 and October 30, 1697). The last of these powers had, however, made a separate peace the year previous, so that the Peace of Ryswick was only signed by France and the other four powers. The negotiations for peace were conducted through the mediation of Sweden. A general congress was held at Ryswick from May 9, 1697, until September 20 of the same year, when England, Spain, and Holland signed a treaty of peace with France. Louis XIV. restored all his recent conquests in Catalonia and the Spanish Netherlands, and acknowledged William III. as king of Great Britain and Ireland. The emperor and empire first signed the treaty of peace with France, October 30. Louis restored all the places which he had taken possession of in Germany, with the exception of those which were situated in Alsace, the sovereignty of which was conceded to him. He likewise retained the free city of Strasburg, which was taken in 1681. The clause of the fourth article of the Treaty of Ryswick, according to which the Catholic religion, which had been introduced into the 1922 places now restored by the French, was to remain as it then stood, gave much dissatisfaction to the Protestants.

RZESZOW, or **Ressow**, a town in Austrian Galicia, in a deep valley watered by the Wyalok, 94 miles west by north of Lemberg. Christians and Jews nearly divide the population. The former are chiefly employed in linen weaving and general trade, the latter are almost all workers in a kind of spurious

material called 'Rzeszow gold,' which they make up into various kinds of trinkets, and employ in setting false jewels. These are not much in request in the home market, but find a large sale in Russia, Wallachia, Moldavia, Servia, and Bosnia. Pop. in 1880, 11,166, in 1890, 11,953

S.

S, the nineteenth letter of the English alphabet, representing the hissing sound produced by emitting the breath between the roof of the mouth and the tip of the tongue placed just above the upper teeth, so that the air is driven through the teeth. From this circumstance *s* has sometimes been reckoned among the linguals (as the tongue is essential in its pronunciation), sometimes among the dentals (as the teeth co-operate in producing the hissing sound). It is also sometimes called a semi vowel, as it can be pronounced without the assistance of a vowel, and the sound be prolonged indefinitely, like *l, m, n, r*. In pronouncing *s* the breath may be driven with more or less violence over the end of the tongue, hence, in most languages, it has a twofold pronunciation—sharp, as in *sack, sin, this, thus* and soft (when it is equivalent to *z*), as in *music, wise*. The German *Sinn* (pronounced *zin*) and *Maus* (pronounced *mouse*), and the French *sort* and *basse*, are also examples of these two sounds. In German the *s* is soft at the beginning of a syllable and sharp at the end or in the middle, while the contrary is usually the case in English. But in some parts of Germany (for example, Holstein) *s* at the beginning is sharp. *S*, and the sound of *sh*, have a great tendency to become prefixed to the root of words, or more probably the true explanation is that they often fall away from words or roots in which they have originally formed an element, for example, *slime* (German *Schlamm*) corresponds in this way to *lime*, Latin *limus* (mud), in German *Lehm* and *lime*, and *slippery* (in German *schlupfrig*) may thus be connected with Latin *lubricus*. In Latin an initial *s* frequently represents the Greek aspirate, thus the Greek *hus, hēlios, hulē*, and *hudos* correspond to the Latin *sus, sol, sylva*, and *sudor*. Latin words beginning with *s* followed by a consonant frequently have the initial *s* represented in the corresponding French words by an *é*. *Ut*, for example, corresponds to the Latin *status, épue*, to *specus, étain*, to *stannum*, *étale*, to *stabulum, écriture*, to *scriptura*, &c. &c. This change was a gradual one. First an *i* was prefixed to the Latin words, as that vowel is still often prefixed to similar Italian words, especially when the preceding word ends with a consonant (*per ischerzo*, for *per scherzo*, *con isperienza*, for *con speranza*). In inscriptions of the fourth century *spatium* is found for *spatium, istatua* for *statua, istabilis* for *stabilis*, &c. Secondly, this *i* was changed into *e*, and such forms as *estatua, espatium, esperare* are found in inscriptions and other monuments of the Latin language belonging to the fifth century. In many French words this is all the length that the initial change has gone, as in *espace, espérer, espèce, estomac, esprit*, &c. Thirdly, the *s* was dropped, producing such forms as those instanced above. Notwithstanding the predominance of the letter *s* in most languages, particularly in English, the people of the South Sea Islands cannot pronounce it at all, and say, for instance, instead of *Ellis, Ellié*. The sounds of the letters *s, r, t*, and the sounds of

sh and *th*, are all produced by a very similar motion of the organs, and hence the frequent change of the *s* into the other letters. (For examples of the interchange of *s* and *r* see the article *R*.) The sound *th* is the transition between *s* and *t*, hence the third person singular of the present tense, ending in German in *t*, ended formerly in English in *th*, and now in *s*, for example, *has, hath* (German, *hat*), *brings, bringeth* (German, *bringt*). *S* often alternates with the sound *sh* (written in German *s/h*), and some German tribes, particularly the Suabians, change the *s* regularly into *sch* when it precedes another consonant, thus they say *buscht* and *hascht* (pronounced *bisht* and *hasht*) for *bist* and *hast*, and even in High German *s*, at the beginning of a word, followed by another consonant, is generally pronounced *sh*. The Attic dialect in Greek frequently preferred the sound of *t* to that of *s*, thus *tarassō, prassō, thalassa* were in Attic *tarattō, prattō, thalatta*, and in late Attic *tēmeron, tukon*, &c., are found for *sēmeron, aukon*, and the like. It is a peculiarity of *s* that it may be sounded before all the simple consonants—a circumstance which makes it so formidable a letter to lexicographers and encyclopaedists. In the middle ages *s* (the initial of *septem*) was used in Latin as a numeral for seven. Among the Greeks *σ'* signified 200, and *ς* denoted 200,000. The same *ch* of the Hebrew, *ç*, denoted 50, and with two points above, *ç*, it signified 50,000. *S* is the common abbreviation for *societas* and *socius* (fellow). *S S* stands for *sanc tissimus*, *S D* for *salutem dedit*, *S P D* for *salutem plurimum dedit*, *S P Q R* for the famous *senatus populusque Romanus*, *S T* for *sancta synagoga*. *S*, in geography, stands for *south*, in music, for *solo* (alone). On French coins *S* signifies Rheims. See ABBREVIATIONS.

SAADI. See SADI.

SAALB., the name of several German rivers, the most important of which is that which rises on the north side of the Fichtelgebirge, in the north east of Bavaria, flows N N W into the principality of Reuss, then almost due north, then west, across Schwarzburg Rudolstadt, N N W past Snafeld in Saxe Coburg, N E into Saxe Gotha, passes Kahla, Jena, and Kainburg enters Prussian Saxony, and proceeding very circuitously, but in the main nearly due north, passing Mersburg, Halle, where it becomes navigable for barges of about 75 tons, and Bernburg, the last in the Duchy of Anhalt, and joins the Elbe on the left, 6 miles below Calbe, after a course of above 200 miles. It is of great commercial importance, its channel being generally wide and deep.

SAARBRÜCKEN, a town in Prussia, in the Rhine Province, on the Saar, 39 miles S E of Trèves. It is an ancient place, which was once strongly fortified, and governed by its own counts, from 1381 to 1793 by counts of the house of Nassau Saarbrücken, and till 1801 (when it was annexed to France) by counts of the house of Nassau Usingen. It became Prussian in 1815. It is tolerably well built, and has

a castle. It also has manufactures of tobacco, cigars, stoneware, chemical products, and iron, tanning and cotton spinning are also carried on, and in the neighbourhood are very productive iron and coal mines. On the 2nd of August, 1870, Saarbrücken was the scene of an unimportant engagement between the French and Germans, in which the former had the advantage, forming the first engagement in the Franco-German war. Pop (1900), including St Johann, which lies across the river, 44,499.

SAARDAM. See ZANDAM.

SAARLOUIS, or SARRLOUIS, a town in Prussia, in the Rhine Province, on the Saar, 30 miles south of Treves. It has manufactures of trinkets and leather, and a trade in iron and lead obtained from mines in the vicinity. Saarlouis was long held by France, and was fortified by Vauban. In 1815 it fell to Prussia, and in 1889 the fortress was demolished. Marshal Ney was born in the neighbourhood. Pop (1895) 7368.

SAAVEDRA Y FAXARDO, DIEGO, COUNT OF, celebrated both as a writer and a statesman, was born in 1584 at Algezares in Murcia, and studied at Salamanca, where he took his degree of Doctor of Laws. In 1606 he proceeded to Rome with Borgia, as secretary to the Spanish embassy, became Spanish agent to the Romish court, and was afterwards ambassador at several other courts. In 1636 he attended the Diet of Ratisbon, and in 1643 was sent by Philip IV to attend the peace congress at Munster. At his death in 1648 he was a member of the high council of the Indies. Among his writings are—*Empresas Politicas ó Idea de un Principe Politico Christiano* (Monaco, 1640), which has been translated into Latin, and also into many modern languages, *Locuras de Europa*, *Corona Gotica*, *Castellana*, y *Austriaca*, *Politicamente Illustrada*, and *Republica Literaria*. A collected edition of his works appeared at Madrid (1789-90) in eleven vols. They are not free from learned pedantry, but from the perspicuity, force, and elegance of their style rank among the prose classics of Spain.

SAHADELL, a flourishing manufacturing town in Spain, Catalonia, in the province of Barcelona, in the valley of the Ripoll. The chief manufacturing employments are wool and cotton spinning and weaving, but paper is also made. The manufactures of the place are of comparatively recent growth. Pop (1887) 19,645.

SABADILLA, CEBADILLA, or CEVADILLA, the name given in commerce to the pulverized seeds of two plants, the *Asagraea officinalis* of Lindley, and the *Veratrum Sabadilla*, both belonging to the natural order Liliaceæ. The powder obtained from the seeds was used in medicine as early as the end of the sixteenth century, but it was long uncertain from what plants the seeds were derived. Mexico was always understood to be its native place, but in the nineteenth century a West Indian plant was discovered which produced seeds exactly like those circulating in commerce, and yielding the powder known as sabadilla. To this plant Descourtiz accordingly gave the name of *Veratrum Sabadilla*, the name which Retzius had given to the sabadilla plant, which he had described on the strength of some bits of inflorescence that he had found in samples of the seed. But not long after this discovery a Mexican plant was found to produce seeds like the sabadilla seeds of commerce, and containing the chemical principle called *veratria*, to which the sabadilla owes its properties, in a still more concentrated form than those of the *Veratrum Sabadilla*, and this Mexican plant seems to be the one from which the sabadilla seeds are chiefly, though not exclusively, obtained. This plant was described by Schlechtendahl and Chamisso under the name of

Veratrum officinale, but it was afterwards known as *Asagraea officinalis*, the genus *Asagraea* (named in honour of Asa Gray) having been formed for it by Lindley. More recent names are *Schanocaulon officinale* and *Sabadilla officinalis*. It is characterized by a bulbous root, linear leaves channelled on the upper side, keeled at the back, a scape or leafless flower stalk, 5 or 6 feet in height, terminated by a raceme 1½ foot long, bearing flowers with a white or slightly yellowish perianth, the segments of which are linear and shorter than the filaments, and a tri-lobular fruit, each capsule or follicle containing one, two, or three seeds. The *Veratrum Sabadilla* resembles this plant, but differs in having ribgrass-like leaves, purple flowers, and the segments of the perianth ovate or lanceolate, and longer than the filaments. The seeds of both plants are blackish and wrinkled, and of an acrid and burning taste. They are highly poisonous, in spite of which the powder obtained from them is still administered internally on the Continent in small quantities as a vermifuge, in cases of tape-worm and ascariæ. In this country they are chiefly used in the manufacture of veratria or veratrine, which, in the form of a tincture or ointment, is used as an external application in neuralgia and obstinate rheumatic pains, also to destroy lice. But even as an external application it should be avoided when the skin is broken, since absorption in this way is said sometimes to produce fatal consequences.

SABÆANS, the ancient name of the inhabitants of the modern Yemen, in Arabia. Ptolemy places them in the north and middle of what is now called Yemen, and earlier geographers to the south of that province, but the fact appears to be that they were a race dwelling on both sides of the Red Sea on its southern shores, in Arabia and Ethiopia. The names applied to the peoples dwelling on the different sides of the Red Sea were very like, Shebaim being that of the Arabian section, and Sebam that of the Ethiopian. The country of the Shebaim was probably the Sheba of the Bible, the land of the queen who came to visit Solomon. It was fertile and rich in spices and perfumes, and carried on an extensive trade with the East. Its capital was Saba.

SABÆANS. See SABIANS.

SABBATARIANS, a name formerly applied to a sect of Baptists who keep the Jewish Sabbath or seventh day of the week, instead of Sunday, as a day of rest and abstinence from secular pursuits. They originated in the reign of Queen Elizabeth, and are now generally called Seventh day Baptists, while the term Sabbatarians is now most commonly used to designate those who uphold most rigidly the observance of Sunday as the Christian Sabbath.

SABBATH (a Hebrew word signifying rest) is the day appointed by the Mosaic law for a total cessation from labour, and for the service of God, in memory of the circumstance that God, having created the world in six days, rested on the seventh. The first notice in the Old Testament pointing to this institution occurs in Gen. ii. 2, 3, where it is said that God rested on the seventh day from all his work which he had made, and blessed the seventh day and sanctified it, but the first formal institution of the day as a holy day and a day of rest is recorded in Exod. xvi. 22-26, on the occasion of the children of Israel gathering manna in the wilderness. Soon after the observance of the day was re-enacted still more expressly and emphatically in the tables of the law. It has been much disputed whether the prohibition of the gathering of manna on the seventh day of the week in Exod. xvi. 26 ought to be regarded as the origin of the institution or not. It is a matter which we have not the means of satisfactorily deter-

mining, but the manner in which the prohibition was made certainly gives much probability to the view (first contended for by Grotius), that that prohibition merely gave a formal sanction to a practice previously existing of treating the seventh day of the week as sacred, and added an express prescription as to the manner in which respect for the day was to be shown. All that was positively enjoined on the Jews for the keeping of the Sabbath-day was total cessation from labour (Exod. xx. 10), and in this respect the protection of the law was extended not only to all Jews in whatever capacity they might be employed, but in accordance with the humane spirit of the Mosaic legislation even to strangers, although many commentators are of opinion that the strangers intended are partial proselytes, and not those who are altogether non-participant in the Jewish religion. But although rest was the only positive injunction with regard to the Sabbath, there is abundant evidence to show that a peculiar sanctity attached to the day, that it was a day of special religious exercise, on which their attachment to God was to be manifested and confirmed. This we may gather from the fact that on this day the morning and evening sacrifices were doubled, and the show bread changed, but still more from the exhortations and warnings of the prophets as to its observance or neglect (Isa. lviii. 13, 14, Jer. xvi. 21-27, Ezek. xx. 12-24). In respect to the sanctity attaching to it the weekly Sabbath corresponded with the seventh or sabbatical month Tisri, in which occurred the feast of Trumpets, the day of atonement, and the feast of Tabernacles, and with the seventh or sabbatical year, in which the land was to rest, as well as with the year of jubilee. See SABBATICAL YEAR and JUBILEE.

The same passages as have just been cited to show the sacredness and religious character of the Sabbath may also be referred to as proofs of the indifferent way in which the institution was observed before the captivity. After the return from the captivity, however, Nehemiah exerted himself greatly to have the Sabbath properly kept (Neh. viii. 9-12, x. 31, xiii. 15-22), and after his time the Jews appear always to have paid an outward and formal respect to the institution, which was observed also by their neighbours the Samaritans. The interpretation of the injunction of abstinence from labour was after the captivity so strict that the Jews even looked upon the work of self-defence as forbidden on that day, and Mattathias found it necessary to decree its lawfulness (1 Mac. ii. 4). This decree of Mattathias seems to have been effective for the time being, but the same scruple afterwards revived, and both Pompey and Herod were able to take advantage of it in their sieges of Jerusalem. At the same time the original law became encumbered with a long list of petty Pharisaical and rabbinical regulations, attention to which was considered as the true observance of the Sabbath day. In such small matters the Samaritans were peculiarly strict, and the founder of one sect among that people went the length of maintaining the duty of so complete an abstinence from labour on the Sabbath, as to require one to preserve the same position throughout the day as that in which one happened to be when the day began. This extreme never seems to have been reached by any section of the Jews. They indeed took a totally opposite mode of interpreting the prohibition to labour, regarding labour as opposed to pleasure, so that everything that could be construed as labour, in that sense of the term, was carefully eschewed, while all kinds of pleasure were freely indulged in. Such at least was the reproach of the early Christians, who in this respect contrasted the Jewish mode of observing the Sabbath with their own celebration of

the Lord's day. And the truth is that we have no reason to believe that the Jewish Sabbath, though a day of religious celebration, was ever intended to be consecrated exclusively to acts of devotion and to religious meditation. The very reverse seems to have been the case, to judge from Nehemiah's account of the revival of the institution, where the day because it is holy unto the Lord is pronounced a day of mirth and rejoicing, one on which the people were 'to eat and to drink, and to send portions, and to make great mirth' (Neh. viii. 9-12).

In the Gospels the references to the Sabbath are numerous, and they show us that Christ always paid respect to the institution according to the spirit in which it was established, although he did not regard the minute prohibitions that had been added to the original law. In the epistles the Sabbath is only once mentioned, in Col. ii. 16, where it seems to be abolished so far as Christians are concerned. In 366 the Council of Laodicea removed all scruples as to the duty of Christians to keep the Jewish Sabbath.

In the earliest times of Christianity the law of the Sabbath, like other parts of the Jewish faith, could not be received into the new religion, except spiritualized and refined like the sacrifices and other ceremonies. St. Paul explicitly treats the reverencing of certain days as invested with a holy character by a divine ordinance as Jewish and unchristian, and as a return to the servitude of the law (Gal. iv. 10). The first communities assembled every day, for example, the community of Jerusalem for common prayer, meditation on the Word, communion, and love feasts. Traces of these daily meetings are found even later. With the spread of Christianity, however, and the necessity of instructing a greater number, the appointment of a certain time for this service became necessary. This was not a departure from the spirituality of the new religion, but only an accommodation to the wants of mankind. In the same way peculiar persons became priests, though all Christians had an equal sanctity of character, and the departure from the spirit of Christianity consisted only in assuming a peculiar spiritual character for the priests. The gradual adoption of forms and ideas from the Old Testament took place in the same way in respect to the Sabbath as in respect to the priesthood. When the Montanists intended to establish new fasts assigned to fixed times, they were reminded of the Epistle to the Galatians, but Tertullian treated the censure of St. Paul as attaching only to the celebration of Jewish festivals (Tertullian, *De Jejuniis*, cap. xiv). The weekly and yearly festivals of the Christians originated from the idea of following Christ, the crucified and the arisen, hence the festival of the resurrection, and the fasts preparatory thereto. In each week the joyous festival was on Sunday, and the preparation for it was on Wednesday and Friday, the days of the Saviour's passion. This point of view is necessary for a right understanding of the early festivals. The desire of distinguishing the Christian from the Jewish observance early gave rise to the celebration of Sunday, the first day of the week, instead of the Jewish Sabbath. The first trace of this celebration is supposed by some to be found in Acts xx. 7. This passage is, however, by no means conclusive, because the community collected on the first day of the week might easily have been assembled by the near departure of St. Paul, and still less can be proved from 1 Cor. xvi. 2. The only tolerably clear reference in the New Testament to this celebration as customary among the early Christians, is in the Apocalypse, i. 10, where there can be little doubt that by the Lord's-day (*hē kurakē hēmera*) is meant the first day of the week. In the letter of Ignatius to the Magnessians (ch. ix.) allusion is made to the Sunday cele-

bration, as the symbol of a new life consecrated to the Lord, in contradistinction to the former Sabbath Sunday was distinguished as a day of joy, so that none fasted on it, people prayed standing, and not kneeling, in allusion to Christ having raised fallen man. Wednesday and Friday, the latter particularly, were sacred to the memory of the Saviour's passion. Jewish-Christian communities, however, retained the celebration of the Sabbath, though they adopted also that of Sunday, and thus it became customary in the Oriental Church to distinguish this day also by not fasting, and by praying in a standing posture on the other hand, in the Western, and particularly in the Roman Church, in which the opposition to Judaism prevailed, the custom grew up of using the Sabbath particularly as a fast-day (Tertullian, *De Jej cap xiv*) And when at a later period the causes of this fasting on Saturday were lost, legends were invented to explain it, such as that Peter had fasted on this day to prepare himself for the disputation with Simon Magus. Tertullian speaks of this difference between the Oriental and Western Churches with much moderation. The learned Hippolytus wrote at the beginning of the third century on this point of dispute (Hieronymus, *Ep 72, ad Vital*) Constantine the Great made a law for the whole empire (321 A D), that Sunday should be kept as a day of rest in all cities and towns, but he allowed the country people to follow their work on that day. In the year 538, however, the Council of Orleans prohibited country labour, but because there were still many Jews in Gaul, and the people fell into many superstitious uses in the celebration of the new Sabbath, in imitation of the practices of the Jews, the council declares that to hold it unlawful to travel with horses, cattle, and carriages, to prepare food, or to do anything necessary to the cleanliness and decency of houses or persons, savours more of Judaism than of Christianity. The Reformation, abolishing so many of the festivals, which had increased in the Roman Church to an immense number, naturally elevated the character of those which it left, as Easter, Christmas, &c., and Sunday, but Sunday, though considered by the Lutherans as a proper day for religious service, was never regarded by them with that awe which is connected with its observance in some countries. It is with them a day of rest and enjoyment, and many amusements are taken by Protestants on the European continent during that day, which people there would think improper on week days appropriated for labour. Calvinism, which is of a stricter character than Lutheranism, has in most countries enjoined a careful observance of the Sunday, but even at Geneva the Sunday evening is spent in various amusements, in visiting, dancing, playing foot ball, &c., and the labours of husbandry are permitted in harvest on Sundays. The custom of calling Sunday *Sabbath* indicates a belief that the obligations of the Jewish Sabbath extend to the Christian Sunday. This view of the matter has been adopted by the Presbyterians in Scotland, by the Low Church party in the Church of England, and generally throughout the British dominions and the United States by those religious bodies professing what are termed evangelical sentiments. A controversy has existed as to the time when the Christian Sabbath begins, many clergymen maintaining that it begins at sunset on Saturday, and some communities have acted on this view in their mode of observing it.

The works on the Jewish and the Christian Sabbath are extremely numerous. Among the most important are Heylin's *History of the Sabbath*, Maurice's *Sermons on the Sabbath day*, Baden Powell's *Christianity without Judaism*, Gilfillan's *Sab-*

bath viewed in the Light of Reason, Revelation, and History, Hengstenberg on the Lord's Day, translated by J. Martin, Wardlaw on the Sabbath, Hessey's *Sunday its Origin, History, and Present Obligation*, Gardner and Spedding's *Studies in English History*, Lewis's *Critical History of the Sabbath and the Sunday in the Christian Church*, &c. Valuable observations on the beneficent character of the institution, with reference to the moral and physical nature of man, are to be found in Proudhon's *De la Célébration du Dimanche*, considérée sous les Rapports de l'Hygiène publique, de la Morale, des Relations de famille et de cité.

SABBATICAL YEAR, among the Jews, every seventh year, which, by the law of Moses, was to be a year of rest for the land (*Exodus xviii 10, 11, Leviticus xxv 1-7*). The land was not to be sown, and that which grew of its own accord was not to be reaped, but to be left for the poor to eat. Vineyards and oliveyards were also to be left uncultivated, and their produce ungathered, but the people were allowed to fish and hunt, and attend to their bees and flocks, and a treble produce was promised for every sixth year to make up for the deficiency of the seventh. The sabbatical year was also to be a year of release for Jewish debtors (*Deut xv 1-6*), but those who were able to lend were strictly enjoined not to refuse loans to poor and needy persons because the year of release was at hand (*Deut xv 7-11*). In this year also the law was to be read solemnly to all the people assembled at the feast of Tabernacles (*Deut. xxxi 10*). This institution seems to have been almost entirely ignored by the Jews before the captivity, and in 2 Chronicles xxxvi 21 the period of the captivity is represented as one in which the land was enabled, by the will of God, to enjoy the sabbaths or years of rest that the Israelites had omitted to allow it. After the captivity Nehemiah sought to secure the better observance of this septennial sabbath, as he did that of the weekly sabbath (*Nehemiah x 31*), and he seems to have had some success in the former as well as in the latter effort. At any rate the fact that Alexander the Great remitted the Jewish tribute in the seventh year since the Jews were debarred by their religion from employing the means of raising it, is an argument to show that it was observed a hundred years after the time of Nehemiah.

SABELLA, a genus of Annelida or Worms, belonging to the order Tubicola ('tube dwellers') of that class, and of which genus several species occur on the coasts of Britain. The most familiar of these is the *Sabella areolaria* or Shore Sabella, which lives in sand, the head and branchiæ or gills appearing just above the surface of the beach. The tubes of this genus are formed solely of sand, the particles of which are glued together by means of a natural cement secreted by the worms, and thus form a smooth regular tube, presenting a striking contrast in its uniformity to the rougher dwelling-tubes of allied genera, such as *Terebella*. The worm itself possesses a slender body, the hinder part of which may be doubled up within the tube. The head is provided with slender tentacles, which are used in gathering the sand particles for the construction of the dwelling place. *Sabella unispina* is another familiar species of this genus.—**SABELLARIA** is a sub genus of the genus *Sabella*, in which the tubes are clustered together so as to form a kind of social community.

SABELLIANS. See **SABELLIUS**.

SABELLIUS, a Christian teacher at Ptolemais in Upper Egypt, a native of Africa, lived about 250, and is known as the founder of a sect who considered the Son and Holy Ghost only as different revelations or manifestations of the Godhead, but not as separate

persons. The Trinity, according to them, is but a threefold relation of God to the world. The *Logos* of John, called by the church the *Son*, was compared by Sabellius to a ray emitted from the sun, active in and through the man Jesus Christ, but by no means a separate existence from the one God. The doctrines of Sabellius were opposed by Dionysius of Alexandria and Dionysius of Rome, by Epiphanius (who states that the Sabellians were very numerous around Rome and in Mesopotamia), and by Theodoret. St Augustine states that by the beginning of the fifth century they had entirely disappeared. Yet their views have always found adherents, and even now theologians exhibit conceptions of the Trinity coinciding with that of Sabellius, in order to make it intelligible by reason.

SABIANIS, first, a name improperly given by Arabic, Jewish, and Persian writers of the middle ages to heathen star-worshippers, and by Moham medan writers of the twelfth century to the ancient Chaldeans, Buddhists, and adherents of some other religions, secondly, the name of two eastern sects that sprung up at different times, the one about the end of the first century of the Christian era, the other in the ninth century. The first of these two historical sects is that which is mentioned by the name at the head of the article in the Koran and the older Arabic writers. Their doctrines are a mixture of Parsee, Jewish, Christian (especially Gnostic), Mohammedan, and other elements. The Parsee elements seem to have been the oldest, and the origin of the sect is said to have been traced to one Elxai or Elchasi (identified with the Scythians mentioned in our article on the Manichees), a native of Parthia, who, about the time already indicated, spread Parsee doctrines and rites among the Nabatheans of North-eastern Arabia and Southern Mesopotamia. The other elements of their creed were subsequently and gradually adopted, partly, it would seem, to conciliate their neighbours and rulers. The adherents of this sect are still scattered in small numbers over the region lying about the Lower Euphrates and Tigris in Bassora, Mohammura, Hawisah, Dizful, Shuster, and other places. Formerly they were known in Europe under the name of Nazareans (which in their own writings is used as the designation only of very pious and learned men), but more commonly as disciples or Christians of St John, because they regard John the Baptist as the only true prophet. The appellation of Christians of St John is peculiarly inappropriate, since they altogether reject Christianity, and consider Christ to have been only a powerful magician. Among themselves they are called Mandates or Mandaites, inasmuch as they derive their religion from Manda de haye, an emanation from the first life, or the God that manifests himself and operates in the world. It is in relation to other sects that they are called Sabians (Sabun), and this name they owe to their frequent use of water in purifications, baptisms, &c. The doctrines of these Sabians are contained in certain writings, regarded as sacred, in the Aramaic dialect. Till recently they were very imperfectly known. In 1816 Norberg published an edition of their 'great book' (Sidra rabba) or thesaurus (Ginza), but there was still much requiring explanation both in the language and the matter of the book. A more thorough knowledge of the Sabians, both as to their circumstances and their doctrines, was conveyed to Europeans by Silvestre de Sacy, and still more by the orientalist H. Petermann, who in 1854 lived several months among them, and published the results of his observations and investigations in his *Reisen in den Orient*, and afterwards prepared a critical edition of the above mentioned Sidra rabba (Leipzig, two vols

1867). The language of the Mandaites has also been treated of by Noldeke (Gottingen, 1862).

The cosmogony or theology of this sect is somewhat complicated. Its chief feature is a dualism like that of Parseism, but in it the active principle of good, the first life, is not original. In the beginning, they hold, there existed the Great Fruit, which contained in itself all the seeds of the world, and along with it the Great Spirit of Glory (Mana rabba). From the latter proceeded the first life or the active deity, and from him emanated the second life, which gave rise to the third, Abathur, the father of the angels (Uthre). A second emanation from the first life was the Manda de haye, the word of life, also designated the beloved son, the high-priest, the teacher and redeemer of man. Hibil, one of his sons, breathed life into Adam and Eve. Under the earth is hell, in whose deepest depths the first-born son of darkness sits enthroned. Hibil (or according to other accounts Manda de haye) descended and closed the mouth of hell, and brought thence Rucha, who bore the heaven storming Ur, the consuming fire, who begot of his mother the seven planets and the twelve signs of the zodiac, which, as well as all other constellations, are evil spirits exercising a malign influence on man. Adam and Eve were pious Mandaites, but a son of Adam was seduced to sin by Rucha. The souls of the wicked suffer punishment in the planets, and at last fall into the open throat of Ur, while the souls of devout Mandaites attain to the intuition of the Mana rabba. At the end of days the earth and hell will be destroyed by Hibil, and the whole universe become a world of light. Abraham, Moses, Jesus, and Mohammed were false prophets, and, as already stated, only John the Baptist a true one. The Sabians observe, besides the Sundays, several festivals, especially that of the New Year, which lasts for seven days, and the baptismal festival, which lasts for five days, and at which all have themselves baptized in running water, which the most pious among them do also every Sunday. The lowest grade of those dedicated to the priesthood is that of *shganda* or deacon, the next that of *tarmada* or scholar. A priest distinguished for learning and uprightness may rise to the rank of a *qanzabra* or treasure keeper, that is, one who is completely master of the *Ginza*, the thesaurus or great book. The highest dignity is that of *reshamma* (head of the people). Both of these last two titles are very rarely conferred. The ten commandments are at the foundation of the Mandait morality, and many of their other moral precepts agree word for word with those of Christianity, especially those of the sermon on the mount.

The other sect of Sabians that arose in the ninth century (about 850) are sometimes called Pseudo Sabians or Syrian Sabians. The last name is due to the fact that the sect originated among the Syrians of Harran and other towns of Mesopotamia. How they came to receive the name of Sabians has been much disputed, and various explanations of the name have been given by themselves, the Mohammedans, and by European scholars, but the truth appears to be that they adopted the name from the earlier sect of Sabians, whose doctrines had ultimately a considerable influence in the development of their own. The religion of these Sabians is described as the heathenism of the ancient Syrians, but modified by the Hellenic influences under which they had lived since the time of Alexander the Great, as also by the influence of Neo Platonism and other religious or philosophical systems. They hold that the eternal and original deity is too much exalted above this world to concern himself directly with its affairs, or for the creatures of this earth to address them-

selves immediately to him. He accordingly leaves the government of the world to certain immaterial spirits or intermediate gods, who, without his will, emanate from him as rays do from the sun, who preside over everything that appears in the air or rises from the earth, and who bring about all the changes that take place in nature. These gods are in their nature free, but their will always inclines to good. Their life is one of perfect bliss. Opposed to this spiritual world is the material world, which alone is imperfect, and the source of all evil, ignorance, and folly. Yet it is itself an emanation from the spiritual world, to which it is likewise destined to return. Man is a creature composed of contradictory elements, he is held down by his passions and animal desires, to raise himself above which he must approach the intermediate gods with heartfelt prayers, invocations, sacrifices, must observe fasts, incantations, and fumigations, and must keep a strict guard over his words and deeds. The deities presiding over the planets, as being the principal emanations from the eternal God, are those to whom his acts of devotion ought chiefly to be directed. The planets themselves ought to be carefully observed, for their influence (through the deities inhabiting them) over the affairs of the world is immense. Every substance and every action, all times and places, have their own planetary deities. Since the planets appear and disappear, and the Sabian worshippers cannot therefore always have in them visible representatives of the deities whom they adore, they make idols to represent them according to certain rules. By such worship, and by steadily striving in all things to lead a devout and moral life, man may rise to such a height of perfection as even to be able to communicate directly with the supreme Power. The soul of man never dies, and in future periods of existence it receives rewards and punishments for the deeds of a past stage. At the end of each great world year, a period of 36,425 ordinary years, this world is renewed, and all living things inhabiting it cease to propagate themselves, and are replaced by generations entirely new.

This sect of Sabians flourished for little more than 200 years. At first they enjoyed the favour of the Mohammedans, as well as of Christians and Jews. Many of them were distinguished for their learning and for their services to all branches of science, philosophy, and literature, and as these often enjoyed honourable posts under the caliphs of Bagdad, they were frequently mistaken for Mohammedans by the Europeans to whom their fame reached. Latterly, however, they were subjected to persecution by the Mohammedans, and by the twelfth century they seem to have almost totally disappeared. It is a doubtful matter whether some small remnants of them may still exist in remote parts of Mesopotamia.

The sources of information regarding these Sabians are Arabic, Hebrew, and Greek works. See Wellhausen's *Reise in Mesopotamien* (1897), Dozy and De Goeje's *Memoire contenant de nouveaux Documents pour l'Étude de la Religion des Haranens* (1885), &c.

SABICU, a leguminous tree, *Lysiloma Sabicu*, a native of Cuba. It furnishes an exceedingly heavy and hard wood, with a texture almost as smooth, close, and firm as ivory, and of a rich warm, red colour. It is much employed for ship building and cabinet making.

SABINES (*Sabini*), an ancient people widely spread in Middle Italy, belonging to the Indo-European family. In the widest sense the name was applied to all the tribes inhabiting the slopes of the Apennines, from Umbria in the north to Lucania and Apulia in the south, as well as the maritime

districts on the east between Picenum and Apulia. But these tribes were divided into three great classes: the Samnites, in the south, who are noticed in a separate article, the Sabelli, in the middle and on the coast, including the tribes of the Frentani, Marsi, Peligni, Marrucini, and Vestini, and the Sabines proper, in the north. The Sabine country, in the more restricted sense, was separated from Etruria by the Tiber, towards the south, by the river Anio (Teverone), from Latium, and towards the north, by the river Nar, from Umbria, towards the east dwelt the Sabelli, separating the Sabines proper from the Samnites and from the Adriatic. The Sabine country was rich in pasturage, and the tending of flocks formed the chief occupation of the people. Horace has celebrated the honesty, modesty, and simplicity of manners of the Sabines. In early times they maintained their freedom with great bravery against the Romans, but were finally subdued by M. Curius Dentatus, B.C. 290, when they received the Roman franchise, but without the right of voting. The Sabellian tribes had previously concluded treaties of alliance with the Romans, the Vestini in 328, and the Marsi, Marrucini, Peligni, and Frentani in 304. If tradition may be credited the Sabines, while still free, had a singular manner of providing for the excess of population. At intervals they vowed what they called a sacred spring, which they consecrated by great sacrifices, and all the children who were born in the year when such a season was vowed, or, according to other accounts, during the period of the sacred spring itself, were bound, on attaining the military age (twenty), to quit their homes and seek new settlements for themselves. See **ROME**—History.

SABINES, RAPE OF THE. See **ROMULUS**.

SABLE (*Martes* or *Mustela Zibellina*), a species of carnivorous Mammalia, included in the family of the Mustelidae or Weasels, and celebrated for affording a valuable fur. The sable is found in Siberia, Asiatic Russia, and Kamtchatka, and generally inhabits wooded districts in the neighbourhood of rivers and water. These animals burrow in the earth, or construct their nests in the hollows of trees. The average length of the sable is about 18 inches, this measurement excluding the tail, which is somewhat bushy. The body partakes of the form of the Weasels generally, in that it is elongated and vermiform. The fur is smooth, glossy, and may be pressed or smoothed in any direction, owing to the mode of attachment of the hairs to the skin. In colour it is a rich deep brown, which near the head may exhibit white markings, and frequently assumes a gray tint about the neck. The fur is heaviest during winter, and the dangers experienced by the sable hunters from sudden snow storms obliterating the track, or from the inclement cold, can hardly be overestimated. The food of the sable varies from an animal to a vegetable diet, in accordance with the season, in summer consisting of other mammals and birds, but in winter, when animal food is scarce, of berries and other plant materials. Sables are for the most part captured in traps, or they may be netted by being driven into nets from their burrows. They are naturally cautious animals, and their pursuit is attended with much difficulty in consequence of their wary habits, but they are also susceptible of being tamed and domesticated. They produce from three to five young at a birth, the young being born in March or April.

Two other species of sable are enumerated, the Japanese Sable (*M. melanopus*) and a North American species (*M. leucopus*). The fur of the former is marked with black on the legs and feet, whilst that of the latter is marked white on these parts.

Skins of the Russian Sable fetch prices ranging from three to ten guineas. The darkest skins are

considered to be the finest. About 2000 skins annually find their way to England. Most of these furs are used in Russia, where about 25,000 are said to be annually collected. When manufactured for linings sable furs may fetch prices so high as 1000 guineas. The corporation robes of the London aldermen are lined with this expensive material, and the tails of sables are used in the manufacture of artists' brushes. The fur of the American Sable is used in England for making muffs, boas, and like articles.

The Tartar Sable (*Mustela Siberica*) is the name given to a species of the Weasel genus found in Northern Russia and Siberia, and possessing a bright yellow fur. This fur is used in the manufacture of furs and artists' pencils, and is used both in its natural state and dyed. The Pekon or Woodshock (*Mustela Canadensis*) of North America is sometimes known as the Hudson's Bay Sable. About 18,000 skins of this animal are annually brought to England. These latter furs are almost invariably dyed of a dark colour when used, and thus made to imitate closely the more expensive Russian Sable.

SABLE ISLAND (French *sable*, sand), a bare treeless island in the North Atlantic, off the east coast of Nova Scotia, 20 miles long and 1 broad. It is sandy, partly covered with grass, cranberries, and other plants. There is here an establishment for the relief of shipwrecked persons, and a light house. The island is gradually decreasing in size.

SABLES, or SABLES D'OLONNE (anciently, *Aïenæ Aulonenses*), a seaport in France, in the department of Vendée, on a peninsula 20 miles s w of Bourbon Vendée. It is built partly on an eminence in the form of an amphitheatre, and partly on a flat, and has a good harbour, much used for refuge, valuable fisheries of shell fish and sardines, and a considerable trade. Pop (1896), 10,261.

SABOTS, wooden shoes. They are largely worn by the peasantry of France, Belgium, Holland, and some other parts of Europe. They are especially useful in wet weather, and in moist places generally, being well adapted to preserve the feet from damp. In France their manufacture is carried on in large establishments in the departments of Aisne, Aube, Maine et Loire, Nord, Somme, and Vosges. In other parts of the country, as on the borders of Orne and Sarthe, where the Wood of Perseigne stretches for several leagues, there dwell great numbers of sabot makers, who work on their own account in their own houses. The same is the case in the department of Maine. Great numbers of sabots are exported by France to Belgium. In some parts of England, as in Lancashire, shoes with thick wooden soles, but with leather vamps or 'uppers,' are worn by most of the artisan class.

SABRE, a broad and heavy sword, thick at the back and somewhat curved at the point. It is the chief weapon of cavalry regiments.

SABRE-TACHE, a leathern case or pocket worn by cavalry officers at the left side, suspended by three straps from their sword belt. It came into use when the jackets of cavalry soldiers were too short or too tight to admit of pockets being made in them, but is now rather ornamental than useful. Its face bears various ornaments, such as a device inclosing the number of the regiment, the regimental emblems, &c.

SACBUT, or SACKBUT, the word by which our translators have rendered the *sabbeka* of the Hebrew Scriptures. The exact form of the *sabbeka* has been much disputed, but that it was a stringed instrument is certain, for the name passed over into Greek and Latin in the forms *sambulê*, *sambuca*, and the instrument so called is described by Athenæus as a harp-like instrument of four or more strings, and of a tri-

angular form. It is not unlikely that this instrument was introduced among the Jews from the East, since one of the musical instruments most frequently occurring in the Assyrian sculptures answers very closely to this description, and may perhaps be identified with the *sabbeka*, the name of which is, besides, Chaldaic. Nothing resembling this Assyrian instrument is to be found on the Egyptian monuments or in the sculptures of Greece and Rome. Since the *sabbeka* was a stringed instrument the rendering *sacbut* is altogether wrong, since that was, at the time when our translation of the Scriptures was made, the name of a wind instrument now called the trombone. See TROMBONE.

SACCATOO. See SACKATOO.

SACCHARIDES, a name sometimes applied to a group of carbon compounds formed from sugars by the action of various organic acids.

SACCHAROMETER, an instrument used for determining the amount of sugar contained in a solution. The name saccharometer is usually confined to instruments whereby the specific gravity of the solution is determined, the amount of sugar present being deduced therefrom. This method of estimation is only applicable to solutions which contain nothing but sugar, for a description of other methods see the article SUGAR.

SACHEVERELL, HENRY, D.D., an English divine of the Establishment, exalted into temporary importance by the spirit of party. He was born in Wiltshire about 1674, and was educated at Oxford, where he graduated as M.A. in 1695. In 1705 he was appointed preacher of St Saviour's, Southwark. While in this station he, in 1709, preached his two famous sermons, the object of which was to rouse apprehensions for the safety of the church, and to excite hostility against the Dissenters. Being impeached in the House of Commons he was brought to trial in February, 1710, and on the 23d of March, when the trial was concluded, was sentenced to be suspended from preaching for three years. This prosecution, however, excited such a spirit in the high church party that it helped to overthrow the ministry of Godolphin, and established the fortune of Dr Sacheverell, who, during his suspension, made a sort of triumphal progress through the kingdom. The same month that his suspension terminated (1713) he was appointed to the valuable rectory of St Andrew's, Holborn, by Queen Anne, and such was his reputation that the copyright of the first sermon which he afterwards was allowed to preach sold for £100. He had also sufficient interest with the new ministry to provide handsomely for a brother. Little was heard of him after this party ebullition subsided, except through his numerous squabbles with his parishioners. His abilities, even according to writers on his own side, were contemptible, and if we may credit Dr Swift he was despised by the ministry whom his notoriety so much contributed to support. He died in 1724.

SACHS, HANS, the most distinguished master-singer of Germany in the sixteenth century, was born at Nürnberg in 1494, and was by trade a shoemaker. He followed his business and made verses with equal assiduity. From 1510 to 1515 he travelled over different parts of Germany, practising his craft, according to the custom of German workmen, in all the towns he visited. In the latter year he returned to his native town, where he was admitted as master in his guild. In 1519 he married. He early attached himself to the Reformation movement, to the spread of which among the *bourgeoisie* he contributed not a little by a poem written in 1523, Die Wittenbergisch Nachtigall, die man jetzt horet uberall, in which he hailed with approval the

proceedings of Luther. In 1544 he was with the army of Charles V in France. He died on the night of the 19th and 20th of January, 1576. The productions of Hans Sachs are extremely numerous. In 1536 he estimated the number of his poems at 5000 or more. Three volumes of his poems were collected and published during his lifetime, and two more were published after his death. In the seventeenth century, after the introduction of a more artificial style into German poetry, Hans Sachs fell into neglect, from which he was not withdrawn till Goethe, who had become acquainted with him in his studies for Faust, drew attention to his merit in a poem (*Erklärung eines alten Holzschnitts vorstellend Hans Sachsens poetische Sendung*) which appeared in the *Deutscher Mercur* (April, 1776). The best edition of his works is that of Keller and Goetze, and the best selection is that of Godeke and Tittmann in *Deutsche Dichter des sechszehnten Jahrhunderts* (vols 4-6, 2nd ed, 1883-85). He possessed a fruitful genius, and, notwithstanding the rudeness of his language, his poems are distinguished for *naïveté*, feeling, invention, wit, and striking description. See Schweitzer's *Étude* (1889), Goetze's *Hans Sachs* (1894), and Genée's *Hans Sachs und seine Zeit* (1893).

SACHSENSPIEGEL, ('Mirror of the Saxons'), a private collection of legal precepts and legal customs which had the force of law in the middle ages in Germany, especially in the north of Germany. One of the six prefaces to the collection mentions one Eyke von Repgow as its author, and this account is generally accepted as true. Its date is supposed to be earlier than 1235, since Brunswick Lüneburg is not included in it among the imperial fiefs with sovereign rights, a rank which that state obtained in the year mentioned. It enjoyed great authority even in foreign countries, as Poland, Denmark, &c., though the pope put many obstacles in its way, and though it was but a private collection. According to the same authority from which we get information as to its compilation it was originally written in Latin, but was afterwards translated by the compiler, at the desire of Count Hoyer of Falkenstein, into the Old Saxon dialect, in which it now exists. It is of much value both for the lawyer and the philologist. The study of it has been revived in Germany. The best edition is by Homeyer (Berlin, three vols 1835-44).

SACK (*secco*, Spanish, *sec*, French, 'dry'), a general name for the different sorts of dry wine, more especially the Spanish, which were first extensively used in England in the sixteenth century. Thus we find the writers of that time speaking of 'sherry sack,' meaning sherry, and 'Canary sack,' for the dry wines of the Canaries. Henderson gives some curious information on this point, on which there has been a good deal of confusion and dispute (*Ancient and Modern Wines*, p. 308, seq.).

SACKATOO, or **SOKORO**, a town in Central Africa, lat 13° 5' N., lon 6° 12' E. It occupies a long ridge, is surrounded by a wall 20 to 30 feet high, consists of regular well-built streets, and many substantial houses in the Moorish style, inclosed by high walls, and has considerable manufactures of cotton cloth, shoes, iron-work, &c., and a considerable trade. The traveller Clapperton died here in 1827. Pop. estimated at 80,000. — The name is also given to an extensive Fellatah kingdom of which Sackatoo was formerly the capital, though Wurno now holds that position. The country is being opened up to British trade, being within the British region known as Northern Nigeria.

SACKVILLE, THOMAS (Lord Buckhurst and Earl of Dorset), an accomplished statesman and poet, was the son of Sir Richard Sackville of Buckhurst,

in the parish of Witham, in Sussex, where he was born in 1536. He was first a member of the University of Oxford, but removed to Cambridge, and afterwards became a student of the Inner Temple. At both universities he was distinguished for his performances in Latin and English poetry, and in the temple he wrote his tragedy of *Gorboduc*, or *Ferrex and Porrex* (published in 1561). Of a poem intended to comprehend a view of the illustrious but unfortunate characters in English history, entitled the *Mirror of Magistrates*, he finished only a poetical preface (the *Induction*) and one legend on the life of the Duke of Buckingham. He was member in the two first parliaments of Elizabeth, after which he travelled. On the death of his father, in 1566, he succeeded to a large inheritance, and was soon after raised to the peerage by the title of Baron Buckhurst. In 1586 he was made a member of the court appointed by Elizabeth to try Mary Queen of Scots. In 1587 he was imprisoned, owing to the influence of the favourite Leicester, in consequence of a report in disfavour of the latter made by him when sent on an embassy of inquiry into Leicester's conduct in Holland, but was released in the following year, Leicester having meantime died. In 1598 he was joined with Burleigh in negotiations for peace with Spain, and signed the treaty which followed with the States-general. On the death of that minister he succeeded him as lord high treasurer. In this situation he was instrumental in discovering the dangerous projects of the Earl of Essex, at whose trial he presided as high steward, in which office he conducted himself with great prudence and humanity. On the accession of James I. his post of treasurer was confirmed to him, and in 1604 he was created Earl of Dorset. He died suddenly at the council table in April, 1608, at an advanced age. This statesman ranks among the most prudent and able of the ministers of Elizabeth, and was a good speaker and a still better writer. His tragedy of *Gorboduc*, the subject of which is a sanguinary story from early British history, is the first example in English of regular tragedy in blank verse. The language is pure and perspicuous, and free from the turgidity which soon after prevailed.

SACO, a river in the United States of America. It rises in New Hampshire, in the White Mountains, and runs south east into the Atlantic below Saco, in Maine. It is 160 miles long, and has falls of 72 feet at Hiram, of 20 feet at Lympington, of 30 feet at Buxton, and of 42 feet at Saco.

SACO, a town in the United States, in York county, Maine, on a river of the same name, which here mingles with the tide water after a beautiful fall of 42 feet. It lies in a district distinguished both by its fertility and the beauty of its scenery. The water power furnished by the falls has led to the erection of important industrial establishments, including cotton and saw mills. Pop. (1890), 6075.

SACRAMENT (Latin, *sacramentum*), literally, anything sacred, in particular, the military oath of allegiance. This word received a religious sense, in the Christian church, from its having been used in the Vulgate to translate the Greek *μυστήριον*. Among the early Latin ecclesiastical writers *sacramentum*, therefore, signifies a mystery, a symbolical religious ceremony, and was most frequently applied by them to the rite of baptism. The Catholic Church considers a sacrament as a visible token, ordained by Christ, by means of which an invisible grace is communicated to Christians. In the course of the history of the Christian church seven came to be reckoned as the true number of the sacraments, and that number is still recognized by both the Roman Catholic and the Greek Church, as well as by the

Monophysite and Nestorian sects The same seven sacraments are not always enumerated, however. The first writer of the Latin Church in whom the present enumeration is found is Petrus Lombardus, of the twelfth century. The same enumeration was given by Thomas Aquinas, and afterwards confirmed by the Council of Florence in 1439, and by the Council of Trent (seventh session, 1547). These seven sacraments, with the passages of Scripture on which they are founded, are 1 Baptism (Mat xxviii 19) 2 Confirmation (Acts viii 14-21, xix. 1-4) 3 The Eucharist (see LORD'S SUPPER) 4 Penance (which see) 5 Extreme unction (Jam. v 14, 15) 6 Orders (Acts vi. 1-7, xiii. 1-4, xiv. 20-24, and 2 Tim i. 6, 7) 7 Marriage, the sacred and indissoluble nature of which is conceived to be taught in Mat v 31, 32, xix. 1-9, Mark x. 2-12, Luke xvi 18, Rom vii. 2-4, 1 Cor vii 10, 11. The Greek Church agrees with the Roman Church in the doctrine of the sacraments (See GREEK CHURCH). The Socinians regard the sacraments merely as solemn rites, having no divine efficacy, and not necessarily binding on Christians. The Protestants, in general, acknowledge but two sacraments, baptism and the Lord's supper, considering a sacrament to be a festival instituted by Christ, by which he who partakes of it worthily participates in the influences of divine grace through sensible means and signs. The twenty-fifth of the articles of religion recognized by the Church of England acknowledges as sacraments only baptism and the supper of our Lord, and of the other five adopted by the Roman Catholic Church it says that they 'are not to be counted for sacraments of the gospel, being such as have grown, partly of the corrupt following of the apostles, partly are states of life allowed by the Scriptures, but yet have not like nature of sacraments with baptism and the Lord's supper, for that they have not any visible sign or ceremony ordained of God.' The different views of the early reformers on the subject of the eucharist are stated in the articles CALISTADT, LUTHER, ZWINGLI, LORD'S SUPPER (See also REFORMED CHURCH). Luther and Melancthon at first acknowledged penance or absolution as a sacrament, but afterwards ranked it only as a preparation for the Lord's supper. The Quakers consider the sacraments merely as acts of the mind, and have no outward ceremonies connected with them. See QUAKERS.

SACRAMENTO, a river in the United States, in California. It rises in lat 42° 40' N., in Goose Lake, in the Sierra Nevada, on the borders of Oregon and the state of California. In its upper part it is called Pitt River. Its general course is southwards, between the Coast Range and the Sierra Nevada, through a valley 300 miles long, at the foot of which it divides into several arms, which unite with those of the San Joaquin from the south, and enter the San Pablo Bay. The Sacramento is navigable for small steamers to Red Bluff, about 300 miles from its mouth, and steamers ply daily on it between the towns of Sacramento and San Francisco. Its principal affluents are the Feather, American, and Butte. The Feather is navigable to Marysville, about 70 miles above the town of Sacramento.

SACRAMENTO, a town in the United States, capital of California, in the county and on the river of same name, 80 miles north east of San Francisco, from which it is 125 miles distant by river. It occupies a low and level plain, and since 1849 has suddenly sprung up into a handsome city, with streets crossing each other at right angles, and often lined with magnificent oaks and aycamores of the original forest. Repeated fires have only served to better its appearance, as it has always been rebuilt in an improved form. It owes its origin and prosperity to

the northern gold fields, all the produce of which is exported by way of this town. The chief disadvantages of the site of the town are connected with the river. In the dry season it becomes so low that none but boats of light draught can ascend, and in wet seasons it sometimes used to rise so high as to inundate the town. Disastrous floods took place in 1850, 1852, and 1853, and again in 1861-62, but means have now been taken to prevent this evil. The state capitol, situated in a large park, cost about half a million sterling. Pop. (1880), 21,420, (1890), 26,386.

SACRED HEART OF JESUS, among Roman Catholics an object of special worship, connected with which is a festival celebrated on the Friday after the octave of Corpus Christi. This worship was introduced by the Jesuits in the latter part of the seventeenth century. In 1674 a member of that order, the Père de la Colombière, was superior of the house of his order at the village of Paray le-Monial, in the department of Saône-et-Loire, in France, and there he had under his charge a nun named Marguerite-Marie Alacoque, a member of the order of the Visitation, who related strange visions, in which she said that Christ appeared to her and addressed to her the tenderest words of endearment. In one of these visions she said that Christ had asked to have her heart in exchange for his own, and that Christ then seemed to take her heart from her breast and put it in his own, which she saw distinctly through the wound in his side, which appeared as brilliant as the sun or a furnace. It then appeared to her that her heart was swallowed up like an atom in a furnace, after which Christ withdrew it in the form of a flame and replaced it in her side. The story of this vision was published by the Père de la Colombière, and his order at once took it up and propagated it, and endeavoured to found a worship upon it. For a long time their efforts were opposed by bishops, cardinals, and even by popes, but they persevered, and succeeded at last not only in spreading the worship throughout the Roman Catholic Church, but also in obtaining the sanction of it from the holy see. This was granted on two occasions by Clement XII. (1732 and 1736), and again by Clement XIII. in 1765. The worship afterwards fell into neglect, but was revived in France at the time of the restoration, and again in 1864, the date of the beatification of Marie Alacoque. It was afterwards brought into renewed favour by the royalist party in the French Assembly. In 1873 pilgrimages were undertaken to Paray le-Monial, chiefly under royalist influences, from all parts of France, and similar pilgrimages visited the shrine of Marie Alacoque from foreign countries, especially England and Belgium. Similar pilgrimages have been common since.

SACRIFICES See OFFERINGS.

SACRILEGE, the alienating to laymen, or common purposes, what was given to religious persons and pious uses. Church robbery, or the taking things out of a holy place, is sacrilege, and by the common law was punished with more severity than other thefts, for the benefit of clergy (which see) was denied to the offender, but it is now put by statute on the same footing with burglary or house breaking. In Scotland also sacrilege has no special punishment attached to it. In France this crime disappeared from the statute-book at the time of the revolution, but was restored by a law passed in 1825. This law was, however, repealed in 1830 by the first legislature that assembled after the revolution of July of that year.

SACRISTAN, the same as *sexton*, which is corrupted from it, an officer in a church whose duty it is to take care of the church and all belonging to it, the sacred vestments and utensils, &c., to open and

close the church, and prepare whatever may be required for the sacred offices.

SACRISTY, the apartment in a church intended for the keeping of the sacred vestments and utensils while not in use, and in which also the clergy and others who take part in religious ceremonies prepare themselves for so doing.

SACROBOSCO, JOANNES DE, sometimes called JOHN OF HOLYBUSH, HOLYWOOD, or HALLIFAX, a celebrated mathematician and astronomer of the thirteenth century. He was probably a native of Halifax, in Yorkshire, but lived chiefly in France. One account says that he entered the University of Paris in 1221, afterwards became a professor there, and died there in 1256. The date of his death as just given is known from his epitaph, but another reading makes it 1244. The most celebrated work of this author is a treatise, *De sphaera mundi*, a paraphrase of a portion of the *Almagest* of Ptolemy. It was printed in 1472, and was afterwards frequently reprinted, with the comments and additions of able mathematicians. He was also the author of a treatise *De Ratione Anni, seu de Computo ecclesiastico*, a work on arithmetic, bearing the title *De Algorismo*, which is one of the earliest treatises on the subject in which the Arabic numerals are used, printed at Paris in 1498, with the Commentary of Petrus Cirvillus.

SACRUM, the bone in man, formed of several coalesced vertebrae, which succeeds the lumbar vertebrae (or those of the loins), and which forms the back part of the pelvis (which see). The sacrum thus interposes behind between the two haunch-bones. In man the sacrum is a bone of roughly triangular shape its apex being directed downwards. It is concave in front, and is composed of five vertebrae fused together by bony union or ankylosis, but the separation or distinction between its component bones can generally be perceived even in the most aged individuals. The neural spines of the vertebrae composing the sacrum are also distinctly perceptible, and four distinct apertures (*sacral foramina*), formed by the union of the transverse processes of the vertebrae, exist on each side. At the summit of the sacrum two articular processes exist, which join the corresponding processes of the last lumbar vertebra, but the lower end of the bone not articulating with any structures—save the *coccyx* or rudimentary tail vertebrae of man—is destitute of articular surfaces. The sides of the sacrum at its upper half bear two large irregular articulating surfaces, coated with cartilage, by means of which this bone articulates with the haunch bone of each side. These surfaces from their rough resemblance to the external ear have been termed *auricular surfaces*.

The sacrum of man is peculiar, and distinguishable from that of all other animals in possessing an entire series of six characters, some of which may be and are shared by other members of his order or class. Thus the sacro vertebral angle is very prominently marked. The ventral surface of man's sacrum is very concave, both in its long and in its cross or transverse diameters. Five or even six vertebrae may coalesce in its formation. It possesses in man a great relative breadth. Its foramina or apertures are of large size, and its spinous and other processes are proportionally small as compared with those of other Mammalia. In most mammals the number of vertebrae forming the sacrum is smaller than in man. Some apes, however, have six, whilst eight or ten may be found in the sacrum of some armadillos. In Birds the lowest number of vertebrae in the sacrum is about ten, and in some birds (for example, Ostrich) as many as twenty vertebrae may coalesce to form this bone. In some Edentate mammals (Armadillos, &c.) and in Bats some of the coccygeal or tail vertebrae may form

part of the sacrum. Fishes possess no distinct sacrum, although in some (for example, Turbot) there may be a false sacrum formed by the union of two of the tail-vertebrae. The sacrum in some Vertebrata, as in the Crocodilia and Urodela, may bear distinct (*sacral*) ribs. And the degree of union between this bone and the other bones of the pelvis may vary greatly from what obtains in the human subject. In the human female the sacrum is said to be wider, much less curved, and directed more obliquely backwards than in the males. The sacrum in man is fully ossified and completed in development from the twenty-fifth to the thirtieth year of life.

SACY, ANTOINE ISAAC SILVESTRE DE, one of the most talented and learned promoters of oriental studies, was born at Paris in 1758. After completing a very careful education given him chiefly at home, in consequence of his delicate health, and obtaining a thorough acquaintance with the Greek and Latin classics, he began the study of Hebrew, and proceeded from it to Syriac, Chaldee, Samaritan, and then to Arabic and Ethiopic. To these acquirements he added those of the principal European languages, including Turkish. He afterwards studied and mastered Persian. In 1781 he was appointed a director of the cabinet of coins, in 1785 an associate, and in 1792 an ordinary member of the Academy of Inscriptions. During the storms of the revolution he withdrew to a short distance from Paris, and lived in retirement unmolested, though his attachment to monarchy was well known. In 1795, when the convention established a school for oriental languages De Sacy was appointed professor of Arabic, and was allowed to retain this situation notwithstanding his refusal to take the oath to the new constitution. Bonaparte, while consul, made him professor of Persian in the College of France (1806), and afterwards bestowed upon him the title of baron (1813). In 1808 he was elected by the department of the Seine into the legislative body, but took no part in the debates till 1814, when he voted for Napoleon's deposition. In 1815 he was appointed rector of the University of Paris, and shortly after member of the commission for public education. While officiating in these capacities he formed around him a circle of scholars, by which he became indirectly the teacher of all Europe. He took a prominent part in founding (1822) the Asiatic Society of Paris, of which he was president, and it was by his recommendation that professorships of Chinese, Sanskrit, Manchoo, and Hindustani were established in the capital. In 1832 Louis Philippe raised him to the peerage. After Remusat's death, which took place in this year, he was appointed conservator of the oriental MSS in the royal library. He died Feb. 20, 1838. It is impossible to attempt even an enumeration of the various labours of De Sacy. Many of them are contained in the learned Transactions of the period. Among others most deserving of notice may be mentioned *Principes de grammaire générale*, Arabic Grammar, and *Chrestomathie Arabe*, with a supplementary volume entitled *Anthologie Grammaticale Arabe*, *Exposé de la religion des Druses*, *Callia et Dumna*, the Pseudonym of Ferrad eddin, and more especially the *Mekâmât of Hariri*, enriched with very full Arabic notes. Considerable interest also attaches to his *Mémoires sur l'Etat actuel des Samaritains*, and his *Correspondance des Samaritains*.

SADDLE. The saddle was in use among the ancient Greeks and Romans. It seems to have been adopted by the latter from the former, since the name by which it was at first known among the Romans was a Greek name, *ephippium* (*ephippion*). This name was afterwards superseded by the Latin *sella* or *sella equestris*. The ancient saddles do not

appear to have been covered with leather like ours, but with padded cloth, and had cloths attached to them, which hung down and covered the horse's sides.

SADDUCEES, one of the two chief sects or parties mentioned in the New Testament as existing among the Jews in the time of Christ. Little is known about them, and as little can be plausibly conjectured. Rabbinical tradition derives their name from one Zadok, a disciple of Antigonus of Socho, who, in the third century before Christ, was president of the sanhedrim, head of the divinity school in Jerusalem, and distinguished for his knowledge of the law, but when this tradition is traced back as near to its source as possible, it is not found to be worthy of credit. Some think that the name of this party (in the Mishna *Tseddikim*, which is the plural of *Tsédik*, meaning 'just' or 'righteous') was adopted by themselves as a title of honour. Others conjecture that the name had a personal origin, as the rabbinical tradition would indicate, but that the Zadok from whom they derived their name was the priest who anointed Solomon as the successor of David (1 Kings i. 39). That the family of Zadok continued in subsequent times to be pre-eminent among the Levitical or priestly houses has been inferred from the fact of the sons or seed of Zadok being several times specially mentioned in Ezekiel (chap. xl. 46, xlii. 19, xlv. 15, xlvii. 11), and it has been conjectured that the Sadducees were nothing else than the Zadokites, or members of this family, together with their adherents. This conjecture is supposed to receive some support from the fact that the Sadducees appear to have been a more aristocratic party than the Pharisees, and that they are mentioned in Acts v. 17 as in close association with the high priest. The author of this conjecture was a German scholar named Geiger.

The leading tenet of the Sadducees was the denial of that of the Pharisees. The latter sect held that there had been communicated to Moses an oral law to complete the written law, that this oral law had been handed down from age to age, and that it was of equal authority with the written law. The Sadducees rejected this theory of an oral law, and though they seem in fact to have followed the traditions held in such respect by the Pharisees, they did not on principle regard them as having equal authority with the written law of Moses. Another of their leading doctrines was the denial of the resurrection of the dead, and this is one of their doctrines incidentally mentioned in the New Testament (Mark xii. 18, &c.). This was a direct consequence of their rejection of the oral law, for the resurrection of the dead is nowhere asserted in the written law, and though there are several passages in Old Testament books not belonging to the Pentateuch which support the doctrine of a resurrection, it must be borne in mind that in the eyes even of the most orthodox Israelite the Pentateuch possessed higher authority than any other part of Scripture. Another Sadducean doctrine mentioned in the New Testament is the denial of angels and spirits. There is some difficulty in reconciling this doctrine of theirs with their acceptance of the Pentateuch, where angels are expressly mentioned. To escape this difficulty it has been suggested by Reuss (*Herzog's Real-encyclopædie*, art. *Sadducaer*), that we are not to understand the words of the New Testament, in which it is stated that the Sadducees say that there is 'neither angel nor spirit' (Acts xiii. 8), in the absolute sense in which they are usually taken, but that they are to be read in the light of the words immediately following—'The Scribes that were of the Pharisees' part arose, and strove, saying, We find no evil in this man, but if a spirit or an angel hath spoken to him, let us not fight against God.' The meaning would then be, not that

the Sadducees wholly denied the existence of angels, but that they rejected the idea of any communication being made by them to man, or at any rate did not hold the same ideas as to the angels as the Pharisees did. Christ's answer to the Sadducees in Mark xii. 25, 'For when they shall rise from the dead, they neither marry, nor are given in marriage, but are as the angels which are in heaven,' is cited by Professor Milligan, in the article on the Sadducees in the *Imperial Bible Dictionary*, as confirmatory of this interpretation, for he argues that this language implies that those to whom it was addressed did not doubt the existence of 'angels in heaven.' Another explanation offered of the difficulty is that the Sadducees considered the angels of the Old Testament merely as transitory and unsubstantial manifestations of God himself. Josephus attributes to the Sadducees another distinguishing doctrine. He says they take away fate, and say there is no such thing, and that the events of human affairs are not at its disposal, while the Pharisees, though not denying human liberty, held that all actions and events were fixed by unalterable decree. A singular fact in the history of the Sadducees is that they rapidly disappeared after the first century of the Christian era. This has been explained as owing, first, to the inclination of the Jews, in their dejection after the fall of Jerusalem, to embrace with preference the more consoling doctrines of the Pharisees, and secondly, to the influence of Christianity. Some have thought that the Sadducees are the original of the Karaites, a Jewish sect that agrees with them in the main point of the rejection of oral law, but no historical connection can be established between the two (See *KARAITES*). The principal authority on the Sadducees is Josephus, a Pharisee, and no work of undoubted Sadducean origin has come down to us. See Schürer's *Geschichte des jüdischen Volkes im Zeitalter Jesu Christi* (3rd ed., 1898), works by Geiger and Wellhausen, &c.

SADI, or **SAADI**, of Shiraz (*SHAIK MOSLEHEDIN SADI EL SHIRAZI*), the most celebrated lyric and moral poet of Persia, was born at Shiraz about the end of the twelfth century (the different dates given are 1175, 1184, and 1190), died about the end of the thirteenth century (according to some in 1291, according to others 1296). After completing his studies, and spending many years in travel, he settled in the neighbourhood of Shiraz, where he enjoyed the favour of several Persian rulers. The Persians esteemed him exceedingly on account of his golden maxims, which they consider as a treasure of true wisdom, and also on account of his pure, elegant, and simple style. Of his works we possess, 1, a collection (*Divan*) of lyric poems in the Arabic and Persian languages, consisting partly of amatory poems, and partly of exhortations to partake in the joys of life, intermingled with serious reflections. 2 A moral work under the title of *Gulistan* (the Garden of Roses), composed both of prose and verse, in eight books, with the following titles: On the Minds and Morals of Kings, On the Minds and Morals of Dervises, On the Quiet and Happiness of Contentment, On the Importance of Silence, On Love and Youth, On Weakness and Old Age, On the Education of Children and Good Morals, and lastly, On the Art of Associating with Men. 3 A work in verse, called *Bostan* (the Orchard), containing a collection of histories, fables, and moral instructions. 4, and lastly, A collection of moral sentences, also in verse, under the title of *Pendnaméh* (borrowed from *Ferid-eddin*). The complete works of Sadi have been published in Persian at Calcutta in two large quarto volumes (1791-95). Graf has published translations from the *Divan* in the *Zeitschrift der Morgenländischen Gesellschaft*, and there is a German

translation of the political poems by Rückert (with life of Saadi, 1894). There are editions of the Gulistan by Sprenger (Calcutta, 1851) and others, and English translations by Eastwick, Ross, &c. The Bostan has been edited by Graf (1858) and Rogers (1891), and translated into English by Davies (1883), and in part by Sir Edwin Arnold (With Saadi in the Garden, 1888). The Pendnaméh was translated into English by Gladwin (1801).

SADOWA, a village on the Bistritz, in Bohemia, not far from Koniggratz. It often gives its name to the decisive battle of the Austro-Prussian war of 1866, fought on the 3d of July of that year, in which the Austrians under Benedek were defeated by the Prussians under Prince Frederick Charles and the Crown-prince of Prussia. To this battle the Germans now give the name of Koniggratz, confining the name of Sadowa to the early part of the engagement, in which Prince Frederick Charles alone withstood the Austrian forces before the arrival of the crown prince on the scene of action.

SAFE-CONDUCT, a security granted by the sovereign authority, or persons delegated by it, to strangers or other persons to enable them to repair to and return from a certain place undisturbed. In most of these cases passports have now taken the place of special safe-conducts. Sometimes the safe-conduct is given to persons accused, to secure them against harm when summoned to an examination. Thus the Emperor Charles V gave a safe-conduct to Luther to induce him to appear at Worms.

SAFES, See SUPPLEMENT.

SAFETY-LAMP. See DAMPS.

SAFETY-VALVE, a contrivance for relieving the pressure of steam or a gas when it becomes too great for the supposed strength of the containing vessel. The commonest form of safety valve on steam-boilers is a lid (*lute*), pressed against a hole (*seat*) by either a spring or a weight. The valve is round, is bevelled round the edge, and is furnished with a spindle which moves loosely in a guide attached to the seat, the seat is bevelled to fit the edge of the valve. On locomotive and on ships' boilers the valve is pressed against the seat by a spring, but on stationary boilers a weight should always be employed. The popular notion that the pressure of the steam against a lifted safety valve is that of the steam against the sides of the boiler is very erroneous, this pressure is very much less than the real pressure in the boiler when any considerable quantity of steam is escaping. Many devices have been tried to do away with uncertainty as to the pressure on the lifted valve, but the simplicity of the ordinary form of safety-valve so recommends it for a duty where the slightest jamming or chance of derangement of a complicated appliance would be highly dangerous that it has hitherto maintained its ground.

SAFFI, **SAFFEE**, or **AZAFFI**, an ancient seaport town in Morocco, on the west coast, about 20 miles south of Cape Cantin, on the slope of a hill, in a sandy barren district. It is surrounded by a wall 31 feet high. Water is scarce, and in summer has to be procured from wells. The bay in front of the town during the summer months, or from March to October, affords as good anchorage and smoother water than any other on the coast, but is entirely exposed to westerly winds. The bottom is sand and mud, and there is generally about 15 fathoms water a mile from the shore. Pop. estimated at 12,000.

SAFFLOWER, or **BASTARD SAFFRON** (*Carthamus tinctorius*), a large thistle-like plant with orange-coloured flowers, belonging to the natural order Compositae. The root is perennial, but the stem herbaceous. It is said to have been originally brought from the East, but is now naturalized in many parts

of Europe, and is besides extensively cultivated. The flowers are used by the Chinese to communicate some of the fine rose, scarlet, purple, and violet colours to their silks. For this purpose the flowers are thrown into an infusion of some alkali, and left to macerate, the colours are afterwards drawn out by the addition of lemon-juice in various proportions, or of any other vegetable acid. Great quantities of these flowers are annually imported into Britain for dyeing and painting. In Spain they are used to colour soups, olives, and other dishes. The Jews in Poland are remarkably fond of the flower, and mix it with their bread and most of their viands. In Germany the plant is cultivated in a light soil, and is sown in rows about 18 inches apart. It is also largely cultivated in Southern France. In September the plants begin to flower, and the field is then gone over once a week for six or seven weeks, to gather the expanded florets, which are dried in a kiln in the same manner as true saffron. The carthamus is sometimes used for culinary purposes, under the impression that it is the true saffron, but if in too great quantities acts as a purgative.

SAFFRON. The true saffron (*Crocus sativus*, natural order Iridaceae) is a low ornamental plant with grass-like leaves and large lily-shaped flowers, inhabiting the European continent, and frequently cultivated for the sake of the yellow stigmas, which were formerly much employed in medicine, domestic economy, and the arts, now they are used by painters and dyers, also in cookery and confectionery. The bulbs are planted in rows 6 inches apart, and 3 from bulb to bulb, in a well pulverized soil, not poor nor a very stiff clay, and in the month of July. The flowers are collected in September, and the yellow stigmas and part of the style are picked out and dried on a kiln between layers of paper and under the pressure of a thick board, to form the mass into cakes. Two pounds of dried cake is the average crop of an acre after the first planting, and 24 lbs for the two next years. After the third crop the roots are taken up, divided, and transplanted. This plant is the *karcom* of the Hebrews (Song of Solomon, iv 14). Saffron was also known to the ancient Greeks and Romans. Other species of crocus are often cultivated in gardens on account of the brilliancy of their flowers and the early season at which they flower. Saffron contains about 65 per cent of a substance called saffronine, 10 per cent of water, 10 per cent of vegetable fibre, 75 per cent of volatile oil, and small quantities of wax, gum, and albumen.

SAFFRON WALDEN, a municipal borough and market town in England, county of Essex, 38 miles NNE of London, situated in a horse-shoe shaped valley. Besides other places of worship it has a spacious and elegant parish church, town hall, corn-exchange, handsome bank, museum, market-place with a fountain, an endowed grammar school, training college, and several other schools, hospital, almshouses, and other charities, reading room, a public library, &c. There is a considerable trade in malt, cattle, &c. Pop. (1891), 6104, (1901), 5896.

SAGA. See SCANDINAVIAN LITERATURE.

SAGAN, a town in Prussia, province of Silesia, 49 miles north-west of Liegnitz, on the Bober. It has a castle belonging to the ducal family of Talleyrand Périgord and Sagan, with fine gardens and park (formerly a residence of Wallenstein), Protestant and R. Catholic churches, gymnasium, seminary for Protestant teachers, hospital, &c.; manufactures of woollen, linen, and cotton cloth, bleachfields, dye-works, distilleries. Pop. (1895), 13,184.

SAGE (*Salvia*). This genus differs from the majority of labiate plants in having but two stamens instead of four. More than 200 species are known

which are herbaceous or shrubby, with opposite leaves, and flowers also opposite, or more frequently verticillate, forming spikes at the extremities of the stems and branches. The garden sage (*S. officinalis*) possesses stimulant properties, is tonic and stomachic, the odour is strong, aromatic, and agreeable, the taste bitter, pungent, and somewhat resembling camphor. The leaves are employed in seasoning dishes.

SAGHALIEN, **SAGHALIN**, or **TARAKAI**, a large island extending along the east coast of Siberia, from which it is separated by the Gulf of Tartary. Its length from north to south is 620 miles, breadth from 17 to 90 miles, area, 28,000 square miles. A range of mountains commences at Cape Orillon or Notoro, in the south-west, and runs parallel to the west coast till near the north end of the island. In the extreme north there is another range further east. A third range begins at Cape Patience in the east, and runs north to Mivo Bay, and the extreme south-east is also mountainous. There are extensive forests of fir, larch, oak, birch, elm, and maple, and timber is largely exported. The sable, otter, fox, and bear are abundant, and are hunted for their furs by the natives, who sell them to Russian, Japanese, and other traders. The fisheries are a great source of profit. Near the shores whales and seals abound. Beds of excellent coal are wrought in Jonquiere Bay, in the west. The coast line has few indentations, and the only ones at all suitable for ships are Dooi, at the south of Jonquiere Bay, and Bousse, on the Bay of Amva, in the south. For many years the Russians and Japanese claimed each a part of the island, but it now belongs wholly to the former. The population consists of Russian and Japanese settlers, and three native tribes—the Giliaks in the north, the Ainos in the south, and the Oroks in the middle. Pop (1897), 28,166.

SAGINAW, a city of the United States, capital of Saginaw county, Michigan, on the Saginaw River, not far above its mouth in Lake Huron. The river is here navigable for the largest lake craft, and communication is further kept up by the different lines of railway. Saginaw and East Saginaw were formerly separate cities, but now form one. There are numerous steam saw-mills, shingle mills, and planing mills, Saginaw being a great centre of the lumber trade, salt works, machine and tool works, grist mills, &c. There is a large trade in lumber, flour, and salt. Pop (1890), 46,322.

SAGITTA, an anomalous genus of Annulose animals, represented by singular transparent forms, of marine habits and elongated shape, averaging about 1 inch in length. The typical species is the *S. bipunctata*, and the name Sagitta has been applied from their presenting a rough resemblance to an arrow. By Huxley, Sagitta is placed in a class (Chaetognatha) constituted expressly for this genus of the Anarthropodous division of the Annulosa, whilst by Professor Rolleston these animals are included among the Echinozoa or Annuloida, and are therein placed in the group Nematelmia.

The head in Sagitta is rounded, and the tail tapers towards its extremity. The head possesses generally six sets of bristles, two sets of long claw-like bristles being placed at the sides of the mouth, the other four sets being shorter and lying forwards on the snout. Behind, the body is bounded by a delicate fin-like membrane, whilst sometimes the body itself may be fringed with setae or bristles. The alimentary tract is a simple straight tube, the anus or vent opening below just in front of the hinder extremity of the body. The nervous system consists of a single ganglion, or mass of oval shape placed in the abdomen. From this ganglion two pairs of lateral nerve cords are sent to the front and hinder parts. The front

cords unite above the mouth in a ganglion of hexagonal shape, which gives off two branches, supplying the smaller ganglia on which the simple eyes rest. The generative system consists of two ovaries placed on each side of the intestine, and opening on either side of the anus. The male organs—for these forms are hermaphrodite—exist in the form of *testicular chambers* or compartments placed behind the anus, and on the walls of these chambers the vesicles from which spermatozoa are developed appear to be produced. The embryos are not ciliated, and do not undergo a metamorphosis.

SAGO, a starchy product yielded by several species of a genus of palms named *Sagus*, and chiefly by *S. Rumphii*, *S. lauis*, &c. The sago palms have thick stems, externally as hard as the bamboo, but filled in the interior with pith or cellular tissue containing a large proportion of starch, from which sago is made. For this purpose the cellular tissue is extracted, bruised in a mortar, and put into a cloth or strainer, it is then held over a trough, and water being poured in, the starch is washed through the cloth into the trough below, the water being then drawn off, the starch is taken out and dried for use or transportation. The preparation of sago constitutes a principal source of employment to the inhabitants of many parts of the coast of Malabar and of several of the East India Islands. Sago is granulated in somewhat the same way as tapioca (see CASSAVA), and in this state enters into commerce (See the plate at PALMS).

SAGUENAY, a river in Quebec province, Canada, formed by two outlets of Lake St. John, which unite about 9 miles below the lake, from which point the river flows south-east, and falls into the St. Lawrence at Tadousac Harbour. Its entire length is about 100 miles. It is interrupted in its upper course by abrupt precipices, over which it dashes in a foam, and is remarkable for the depth and impetuosity of its flood. For 50 miles it flows between walls of rock from 200 feet to 1000 feet high, and presenting remarkably picturesque scenery. The impetuous torrent of the Saguenay when the tide is low is sensibly felt in the St. Lawrence, which for a distance of many miles is obliged to yield to its impulse, and vessels apparently going their course have thereby been carried sidelong in a different direction. The Saguenay is navigable for vessels of any size for a distance of about 50 miles to 60 miles from the St. Lawrence, and at high water for vessels of large dimensions from 15 miles to 18 miles farther. Steamers ascend it several times a week from Quebec during the summer months, with visitors who come for the sake of its scenery.

SAGUNTUM, an ancient town in Spain (Hispania Tarraconensis), south of the Iberus (Ebro), on the Palantias, about 3 miles from the coast. It is said to have been founded by Greeks from the Island of Zacynthus (Zante), who were joined by Rutulians from Italy. The country round was fertile, and the town itself rose to be a place of great commercial importance. It was famous for the manufacture of a beautiful kind of drinking cups. Between the time of the first and second Punic wars it concluded an alliance with the Romans, and its being besieged by Hannibal in 219–218 B.C. was the cause of the outbreak of the latter war. During this siege, which lasted for several months, the inhabitants defended themselves with great courage. When the city was at last taken the greater part of it was destroyed by the conqueror, but the Romans afterwards rebuilt it and made it a colony. The site of the ancient Saguntum is occupied by the modern town of Murviedro, which takes its name (a corruption of *Muri veteres*, ancient walls) from the ruins of the ancient city.

SAHARA is the plural of *Sahra*, which signifies in Arabic an extensive and uninhabited plain, without trees or cultivation. From the frequency of its application in Northern Africa, this term has come to be considered as the proper name of the vast deserts which extend throughout the interior, south of Morocco and Barbary, from the Atlantic to the Nile, through 40° of longitude or 2000 miles. Its area may be assumed to be not less than 2,000,000 square miles. On the south the natural limit of these deserts may be said to lie about lat. 17° 30' N., and towards the east not so high. But there are many circumstances of local configuration which affect both the extension of the rains and their influence on the character of the adjacent country. In general the Sahara has on the south a broad seam of country, too dry for cultivation, yet abounding in excellent pasturage for several months in the year, with sufficiency of water in wells, and occasionally trees, chiefly mimosas and the doum-palm (*Hyphane Thebaica*). The desert of Bahiyuda, adjoining the Nile west of Meroe, is of this description, resembling a rich park at one season of the year (about midsummer), while at another it is little better than an arid and desolate waste. Such also seem to be the northern districts of Darfur and Waday. The north limit of the Sahara is still more irregular and less perfectly defined than the south. The principal oases beginning from the west are Twat, Wargla, and Tuggurt, and the extensive oasis of Fezzan. Artificial oases have been created on the Algerian border by artesian wells. Between the oasis of Wargla and that of Fezzan is an elevated desert plain about 2000 feet in height, called the Hamada of Tripoli. Beyond the oasis of Fezzan the Sahara reaches to the Mediterranean Sea. On the coast Cyrenaica hardly interrupts the prevailing barrenness, but farther inland, wherever fractures in the limestone rock allow the waters to gush to the surface, the oases of Ajilah, Siwah, of El Wah, El Baharieh, El Kharijeh, and others adjacent to Egypt, present vivid pictures of luxuriance and dense population in the midst of burning sands. In the Western Sahara there is a central region named Azawad (the Dry), or El Jout, which is peculiarly dangerous, as it unites all the worst characters of the desert—want of water, intense heat, and moving sands, which obliterate every trace, and render it difficult to find the way. This region extends from the Plateaux of Air or Asben (19° N., 9° E.) and Murzuk (25° N., 14° E.), in the east, to the elevated lands bordering the Atlantic on the west, and from the fertile district of Tafilet on the slopes of the Atlas, and from the oasis of Twat in the north to near Timbuctoo in the south. The precipitous rocks and elevated plateaux by which this region is bounded, the saline deposits which cover it, and other signs, leave little doubt that at a time perhaps not very distant this depression was the bottom of a large inland sea. Part of it is still perhaps below the level of the Atlantic, but at one time some persons maintained that the greater portion of it was so, and that it formed a vast depression which might be again converted into an inland sea by admitting the waters of the Atlantic, thus opening up a new way to the interior of Africa. Mr Donald Mackenzie, a civil engineer who had made some explorations in this quarter, was a strong advocate of this project, maintaining that it could easily be carried out by removing the barrier of sand that has formed itself at the mouth of the Valley of the Belta in the north-west, and letting in here the water of the ocean. Some opposed the scheme on the ground that if carried out it might injuriously affect the climate of Europe, by cooling the warm south winds by which that continent is bene-

fited. Others thought that this would be outweighed by the amelioration that would ensue in that of the rest of northern Africa. Recent explorations seem to have proved that there is no considerable area below the level of the Atlantic and that the scheme is quite impracticable. A similar scheme in connection with Algeria has also been talked of, namely, for letting the waters of the Mediterranean into the Shotts (lacustrine depressions) of Algeria and Tunis and the contiguous flats, but this scheme is now believed to be impracticable. The barrenness of the Sahara is obviously the consequence of its climate, and the almost total privation of rain, the explanation of which would be here misplaced, but it may be remarked that the deserts of North Africa are but the first portion of a desert zone which lies across the Old World, in Arabia, Persia, Western India, and Chinese Tartary. As the skies are generally bright and unclouded, so the evaporation is rapid, and hence the nocturnal cold is often extreme. Ice has been found in Fezzan, as well as on the Nile in Upper Egypt, and this phenomenon is more frequent in dry years. In the noontide sun, on the other hand, the sand often attains a heat of 140° Fahr.

In the desert, properly so called, there is little of animal or of vegetable life. The large animals which characterize South Africa are here wholly wanting. A few species of antelopes are met with in favoured spots. The lion avoids the parched country. Lizards, jerboas, and serpents of many kinds retain undisturbed possession of the burning sands. The land tortoise, of great size, is said to be common towards the south, where bushes grow, there the Ark, or *Salicornia Persea*, generally prevails. Prickly saffron, with other tough and humble plants, are comprehended under the Arab name of *hashish*, or herbage. As the country improves the *Acacia ferruginea* appears, then the Talha (*Acacia Arabica*), and other trees, till the doum and date palms mark the limits of the desert. Yet the date palm itself usually thrives best beyond the limit of the rains. In Fezzan and other tracts, where the date groves constitute the wealth of the inhabitants, heavy rains often prove fatal to the trees, by dissolving and carrying to their roots the salt formed on the surface of the ground.

The population of the Sahara belongs ethnographically to three great sections—the Moorish tribes (Arabs and mixed Arabs and Berbers) extending from the Atlantic eastwards to Timbuctoo and Twat, the Tawarik, a well made, good featured, dark complexioned race, strict and even fanatical Mohammedans, inhabiting the middle region between Timbuctoo and Twat on the west, and Ghadames, Murzuk, and Lake Tchad on the east, and the Tebu or Teda in the east, a race linguistically allied to the Kanuri or people of Bornu, and hence negroes, although their features have in many cases deviated considerably from the negro type through mixture with the Berber tribes. The whole population may be roughly estimated at 2,000,000 or under, of whom there may be about 1,500,000 belonging to the Moorish tribes, 150,000 to 200,000 Tawarik, and nearly 300,000 Tebu. France claims a large area in the south, and a strip on the west coast belongs to Spain.

The tribes of the desert are collectively camel breeders, slave and salt dealers, guides and robbers. A few on the borders of the Sahara possess valleys producing dates, but in general they subsist chiefly on the milk of their herds, obtaining grain or fruits by barter from the Sahel or maritime district in the north, or from Negroland in the south. A pretty active caravan trade is carried on across the Sahara,

by which slaves, gum, ivory, ostrich feathers, and gold dust are brought to the maritime countries on the north, and exchanged for various articles of manufacture. The principal caravan routes lead from Timbuctoo to the Wady Draha in the north west, and to the oasis of Twat, from Hausa by Air or Asben and Ghat to Ghadames and Murzuk, from Bornu by Bilma and Murzuk to Tripoli, from Waday by Ojanga, Kufara, and Ajulah to Benghazi, and from Darfur to Siout.

SAHARUNPUR, or **SEHARUNPUR**, a town in Hindustan, capital of the district of the same name, in the North west Provinces, on a flat watered by the Damaula, an affluent of the Jamna, 90 miles north by east of Delhi. It is built chiefly of brick or stone, with many handsome residences in the European style, and has a government botanic garden, church, fine new mosque, and an American Presbyterian mission. There is a considerable trade in grain, sugar, &c. Pop (1891), 63,300, (1901), 63,850.

SAHIB, the usual term of native address in India towards a respectable European. It is an Arabic word, signifying companion or lord. The feminine form is *Sahibâ*.

SAI, the name applied to the Weeper monkey, or *Cebus capucinus* of the naturalist. This monkey, one of the New World or Platyrrhine forms, inhabits Brazil. The tail is hairy, and not markedly prehensile.

SAIGA (*Colus* or *Antelope Saiga*), a species of Antilopidæ or Antelopes found on the steppes of Russia and on the Russian borders of Asia. It forms one of the two European species of Antelopes, the other species being the familiar Chamois. Its most westerly limit is said to be Poland. The members of the sub genus Saiga are distinguished by the spiral annular horns of the males, these appendages showing two or three curvatures, and being without sharp edges. No muzzle exists, but lacrymal sinuses or 'tear pits' are present. The hair on the instep is arranged in a brush like manner, and inguinal pores, two teats, and a short tail destitute of a tuft, are also developed. The Saiga of Russia averages about 2½ feet in height. The nose is of peculiar structure in that the nasal openings are very large, and are covered by a soft cartilaginous arch. The Saiga of Tartary (*S. Turtarica*) is presumably a distinct species from the commoner form. Its colour is described as being of a light slate colour on the upper and white on the under parts. Its horns are long and bent far back. See also **ANTELOPE**.

SAIGON, or **SAIGUN**, a city and river port, capital of French Cochinchina, of which and of Cambodia it is the chief trading emporium, on the right bank of the river of the same name, 35 miles from its mouth in the China Sea. The town was in great part destroyed on its capture by the French (1859), but has been restored since that time, and now presents much of a European appearance. There is here a citadel, the residence of the governor, barracks, a military hospital, maritime arsenal, graving dock and floating dock, quays, &c. Saigon is a bishopric, and contains a cathedral, a convent, a college of French interpreters, a literary college, and other educational institutions. The Saigon River is navigable, even at ebb tides, by the largest vessels up to the town. The town has an active trade with China, Siam, Singapore, Java, &c., and large quantities of British and French manufactures are imported, mainly by Chinese merchants. The chief export is rice, but cotton, silk, hides, &c., are also exported. The number of vessels cleared in 1900 was 573, with a total tonnage of 770,422. France and Germany have each a larger share of the trade than Great Britain. The harbour is being im-

proved. The markets are well supplied with poultry, hogs, oxen, &c., together with dog's flesh and alligators for native consumption. Rice, areca-palms, and many intertropical fruit plants, grow in abundance around Saigon, being chiefly cultivated by women, and the variety as well as excellence of the fish in the river can hardly be surpassed. Pop about 80,000, including 555 Europeans and over 5000 Chinese.

SAIL. See **SHIP**.

SAILCLOTH, a strong linen, cotton, or hempen cloth (under Armitage's patent, linen and cotton mixed) used in making sails.

SAIL FISH. See **SWORD FISH**.

SAINFOIN. See **SAINTFOIN**.

SAINT ALBAN HALL, a hall at Oxford, named after an Oxford citizen, Robert de St Alban. In the sixteenth century it came into the possession of Merton College, soon after which it was made an academical hall.

SAINT ALBANS, a city and municipal borough in Hertfordshire, England, 20 miles north-west of London. It stands on the summit and slope of a small hill, above the small river Ver. The most interesting building is the abbey church, now forming the cathedral, part of a celebrated monastery founded in 793 by Offa, king of Mercia. It stands on an elevated site, and is a very large and beautiful structure in the form of a cross. Its architecture is of various styles, comprising that of every age from the time of the Normans to that of Edward IV. It has recently undergone extensive restoration. Its entire length is about 550 feet from east to west, including a chapel at the east end, its breadth at the transepts 175 feet. Other buildings worthy of notice are the old church of St Michael's, which contains the remains of Lord Bacon and a well known monument of him, the churches of St Peter and St Stephen, the old tower known as the 'clock-house,' built of flint and stone, in the early Perpendicular style, the town hall, the corn exchange, the hospital, and the jail. The chief industry in St Albans is straw plaiting, and there are silk mills, iron foundries, and breweries. St Albans stands close to the site of the ancient *Verulamium*. It owes its name to Alban, the first martyr in Great Britain, who was buried on a hill near the town, where a monastery was dedicated to his memory. In 1455 a battle was fought here between the Yorkists and the Lancastrians, in which the former, under Richard, duke of York, defeated the latter, and took Henry VI prisoner, and in 1461 another battle was fought between the same parties, in which the Lancastrians under Queen Margaret were victorious over the Earl of Warwick. The town at one time returned two members to Parliament, and now gives name to a parliamentary division of the county. The bishopric of St Albans was constituted in accordance with an act passed in 1875. Pop (1881), 10,930, (1891), 12,898, (1901), 16,019.

SAINT AMAND (*Saint Amand Mont Rond*), a town in France, in the department of Cher, 26 miles south of Bourges, with iron works and porcelain works in the neighbourhood. Pop (1896), 7493.

SAINT AMAND, a town in France, in the department of Nord, on the Scarpe, 7 miles north-west of Valenciennes. It has important manufactures of yarn for cambrics, the finest in France, and hot mineral springs, known to the Romans, and used since the fifteenth century. Pop (1896), 9187.

SAINT ANDREWS. See **ANDREWS (St)**.

SAINT ANTHONY'S FIRE. See **ERYSIPELAS**.

SAINT-ARNAUD. See **ARNAUD**.

SAINT AUGUSTINE, a city and seaport in the United States, capital of St John's county, Florida, on a narrow peninsula formed by the Matanzas and San Sebastian rivers, 38 miles south-east of Jackson-

ville. The climate is mild, which makes it a favourite resort for invalids during winter. It is said to be the oldest town in the United States, having been founded by the Spaniards about 1565. A few specimens of Spanish architecture remain, but these are rapidly making way for modern structures. The Hotel Ponce de Leon is a splendid building in the early Spanish Renaissance style. It occupies a great extent of ground, has garden courts and ornamental gardens. There are other large hotels and several fine churches. Pop (1890), 4742.

SAINT AUSTELL, a town in England, in the county of Cornwall, 13 miles N.E. of Truro, beautifully situated on the southern declivity of a hill. It is an old-fashioned place with no industries to speak of, but has a fine church, a town hall, assembly rooms, &c. It carries on a large trade in china clay, exported from Charleston and Pentowan to the Staffordshire potteries and foreign countries. In the vicinity are a number of tin and copper mines. Pop (1891), 3477, (1901), 3340.

SAINT BEES, a village on the coast of Cumberland, 4 miles south of Whitehaven, having a grammar school, founded by Archbishop Grindal in the time of Queen Elizabeth, and during great part of the nineteenth century a theological college of the Church of England. Pop (1891) 1041.

SAINT CATHERINES COLLEGE, CAMBRIDGE, was founded in 1473 by Robert Wodclarke, D.D., chancellor of the university and provost of King's College, for a master and three or more fellows. The foundation was afterwards enlarged by various benefactors, and there are at present a master, six fellows, and twenty-six scholars.

SAINT CATHERINES, a flourishing town of Canada, in Ontario, on the Welland Canal, 12 miles north-west of Niagara. It has mineral springs, is the centre of a large trade, and contains flour and saw mills, foundries, &c. Ship building is also engaged in. It contains several fine hotels, a convent, a marine hospital, &c. Pop (1891), 9170, (1901), 9946.

SAINT CLAIR, a river of North America, which flows from Lake Huron into Lake St. Clair, separating Canada and the United States. It is about 40 miles long, and of easy navigation.

SAINT CLAIR, a lake in North America, situated between Lake Huron and Lake Erie, and connected with the former by St. Clair River, with the latter by Detroit River. It is 30 miles long, and its greatest breadth is 24 miles, area, 396 square miles. It contains several fine islands.

SAINT CLOUD. See **CLOUD** (St.)

SAINT CYR. See **CYR** (St.)

SAINT DOMINGO. See **HAYTI**.

SAINTE BEUVE, CHARLES FRANÇOIS DE, a celebrated French literary critic, was born at Boulogne-sur-Mer on Dec. 23, 1804. He was educated at a school in his native town, and from 1818 at the Collège Charlemagne and the Collège Bourbon in Paris. He was attracted to the physical and natural sciences by Lamarck, Magnin, and others, and in 1823 he entered on the study of medicine. In 1824 he became a regular contributor to the *Globe*, a liberal and philosophical journal which had several men of high distinction on its staff. A highly eulogistic review of Victor Hugo's *Odes* contributed to this paper in 1827 gained him the friendship of the poet, and began his connection with the romantic movement. For an Academy prize he wrote his *Tableau de la Poésie Française au Seizième Siècle* (1828). In the following year appeared his somewhat morbid novel, *Vie, Poesies et Pensées de Joseph Delorme*, and in 1830 he dedicated a volume of poems, entitled *Consolations*, to Victor Hugo. About this period he was associated with the Saint

Simonians, and afterwards with Lamennais, but he soon broke with them and also with Hugo and the romanticists. His novel *Volupté* (1834), which is essentially autobiographical, may be regarded as marking this turning point in his career, but *Pensées d'Août* (1837), a volume of poems, is still coloured by his religiosity. His next work and his greatest is *Port Royal* (five vols., 1840-48, 5th ed., seven vols., 1888-91), an exhaustive history of Jansenism, begun in the spirit of an admirer and ended in that of an unbiassed critic. During the preparation of this work he studied at Lausanne, but by 1840 he was back in France, and in that year Cousin appointed him librarian of the Mazarin library. He was admitted a member of the French Academy in 1844, and four years later he resigned his librarianship and accepted a professorial chair at Liège. His lectures there formed the basis of his next work, *Châteaubriand et son Groupe Littéraire sous l'Empire* (two vols., 1860). He eagerly welcomed the *coup d'état* and the second empire, and in consequence found it impossible to secure a hearing at the Collège de France, where he was appointed professor of Latin poetry in 1855. He published his undelivered lectures in a volume entitled *Étude sur Virgile* (1857), and from 1857 till 1861 he held the chair of French literature at the École Normale. In 1865 he was appointed a senator, and in this capacity he regained popularity by his defence of freedom of thought and speech against clericals and others. In 1849, after returning from Liège, he began in the *Constitutionnel* the series of Monday critical articles on literary subjects which has gained him a European reputation. The first article was dated Oct. 1, 1849, in December, 1852, he transferred them to the *Monteur*, an official journal, but in 1861 he returned to the *Constitutionnel*, only, however, to leave it again soon afterwards for the *Monteur*. When the *Journal Officiel* was founded in 1868 and the *Monteur* became independent, Sainte-Beuve chose to adhere to the latter, but his first article was cut down by the censor. He at once went over to the opposition *Temps*, where he continued his studies till his death, which took place at Paris on Oct. 13, 1869. These articles were published in two series, *Causeries du Lundi* (fifteen vols., 1851-62) and *Nouveaux Lundis* (thirteen vols., 1863-72), but the posthumous *Premiers Lundis* (3 vols., 1875), containing some of his youthful criticisms, is incorrectly entitled *Portraits de Femmes* (1844), *Portraits Littéraires* (three vols., 1844), and *Portraits Contemporains* (1846) are composed of contributions to the *Revue de Deux Mondes* and similar journals. His other works comprise *De la Liberté de l'Enseignement* (1868), *P. J. Proudhon, sa Vie et sa Correspondance* (1872), *Lettres à la Princesse* (1873), letters to Mathilde, sister of Napoleon III., *Chroniques Parisiennes* (1876), *Correspondance* (two vols., 1877-78), *Nouvelle Correspondance* (1880), *Le Clou d'Or* (1880), letters to Madame D'Arbouville, *La Pendule* (1880), and *Lettres au Professeur Gaulle* (1895). In his *Causeries Sainte-Beuve* rejected all general conceptions, and sought not to generalize or to direct literary movements, but simply to analyse and record. See *Troubat's Souvenirs du dernier Secrétaire de Sainte-Beuve* (1890), *D'Haussonville's Sainte-Beuve, sa Vie et ses Œuvres* (1875), &c.

SAINT ELIAS, a mountain near the western coast of North America, on the boundary between Canada and Alaska, about 25 miles from the Pacific Ocean. It rises 18,010 feet above the ocean, and is completely isolated. Its summit was first reached in 1897 by a party of Italians under Prince Luigi of Savoy.

SAINTE-MARIE-AUX-MINES. See **MAR-KIROH**.

SAINTES, a town in France, in the department of Charente Inférieure, on a slope above the Charente, here crossed by a bridge formerly adorned by a Roman triumphal arch in honour of Germanicus, which is now transferred to the Roman road to Poitiers, 36 miles N N W of La Rochelle. It was a place of importance under the Romans, of whom there are still many interesting remains, and has an ancient cathedral, two other ancient churches, a communal college, court house, library, and theatre. The manufactures include woollen and cotton goods, earthen ware, coaks, and leather, and the trade is in wheat, maize, brandy, timber, &c. It was anciently the capital of the Santones, and afterwards of the province of Saintonge. Pop (1896), 15,485.

SAINT EVREMOND, **CHARLES DE MARQUETEL DE SAINT DENIS**, **SEIGNEUR DE**, French writer of the seventeenth century, born at St Denis le Guast, near Coutances, in the department of Manche, in 1610 died in England, September 20, 1703. He entered the army at the age of sixteen, and fought bravely at Rocroi, Freiburg, and Nordlingen, and even at this early period of his life he laid the foundation of his subsequent reputation as a marvellous talker. During the wars of the Fronde he joined the party of the king, wrote a pungent satire on the opposite party (*Retraite du Duc de Longueville*), and obtained the rank of major general (*marechal de camp*). He now began to play a brilliant rôle among the wits of Paris, he shone in the salon of Ninon de l'Enclos, with whom he always maintained a friendly intercourse, and with equal grace professed and practised the doctrines of the Epicurean philosophy as they are commonly understood. This pleasant mode of life was, however, interrupted in 1661, owing to the discovery of a satirical letter by him on the Peace of the Pyrenees, which was likely to bring down upon him the vengeance of Mazarin. To escape the Bastille he found it necessary to exile himself, and spent most of the rest of his life at the court of the kings of England. Between 1664 and 1670 he lived some years in Holland. He was buried in Westminster Abbey. The writings of Saint Evremond were only circulated furtively during his lifetime, and for the most part in manuscript, but their merit has kept them from perishing. The most celebrated are, *Observations sur Salluste et Tacite*, *Réflexions sur la tragédie et la comédie*, *Discours sur les belles lettres*, *Réflexions sur l'usage de la vie*, *Réflexions sur les divers génies du peuple romain*, *Parallèle du Turenne et de Condé*, and his *Lettres*. The works of Saint Evremond were published at London in 1705. Among volumes of selections, with biographical introductions, are those of Hippéau (1852), Giraud (1865), Lescure (1881), and Macé (1894). See *Saintsbury's Miscellaneous Essays*.

SAINTOIN, **SAINFOIN** (*Ononis echin sativa*), a leguminous plant like the pea, which grows wild in the countries about the Mediterranean, and is often cultivated elsewhere for fodder. The stem is about 1½ or 2 feet high, the leaves are pinnate, composed of small leaflets, the flowers are pretty large and showy, of a fine pink colour, and are disposed in a short spike, upon a long axillary peduncle. Cattle are extremely fond of it. In its wild state it is only found on dry, warm, chalky soils, where it is of great duration, and it is chiefly in such districts that it is cultivated to advantage. Its peculiar value is that it may be grown on soils unfit for being constantly under tillage, and which would yield little under grass. The deeper the soil is stirred previously to sowing the better. The seed is generally put in broadcast at the rate of three or four bushels to an

acre, and sometimes a little red clover is sown afterwards to produce a crop the second season, when the saint-foin plants are but small. Saintfoin is highly nutritive, either cut green or made into hay. The produce, on a medium of soils and cultivation, may probably be estimated at from 1½ to 2 tons the acre. The usual duration of this plant in a profitable state is from eight to ten years. It ordinarily attains its perfect growth in about three years. The proportion of nutritive matter in saint foin is estimated equal to that afforded by white and red clover.

SAINT FRANCIS, a river which rises in Missouri and flows into the Mississippi in Arkansas, lat 34° 45' N. It is a large river, and was formerly navigable 300 miles for large keel boats, but the earthquakes of 1811-12 raised its channel so much, and so irregularly, as to cause the waters to overflow the banks and form a vast number of lakes and irreclaimable swamps along its former course. At high water this river is still navigable at some seasons of the year for about 150 miles, and there are several considerable settlements about 70 miles from its mouth. Its waters abound with excellent fish.

SAINT GALL. See **GALL** (St).

SAINT GEORGE'S ENSIGN, the flag of the British navy, a large white flag with a St George's cross in red upon it and a Union Jack in the upper corner next the mast.

SAINT GERMAIN. See **GERMAIN** (St).

SAINT HELENA. See **HELENA** (St).

SAINT HELENS, a mun., county, and parl. borough of England, in Lancashire, 11 miles E N E. of Liverpool. Till a comparatively recent period an unimportant village, it is now a prosperous town. It owes its rise to the working of extensive coal beds in the vicinity, and the introduction of various branches of manufacture, more especially that of glass, which is carried on in all its varieties to a great extent. Copper smelting and rolling, iron casting and forging, are also extensively carried on, and there are large chemical works, lead works, and potteries, besides a large brewery. A town hall was erected in 1875-76, and a technical institute was presented to the town in 1896. It returns one member to Parliament. Pop (1891), 71,288, (1901), 84,410, parl bor 80,722.

SAINT HELIER. See **HELIER**.

SAINT HILAIRE, **GEOFFROY**. See **GEOFFROY St HILAIRE**.

SAINT JOHN. See **BOLINGBROKE**.

SAINT JOHN KNIGHTS OF. See **JOHN** (St).

SAINT JOHN'S BREAD. See **CAROB TREE**.

SAINT JOHN'S COLLEGE, Cambridge, a college founded in its present form by Margaret, countess of Richmond and Derby, mother of King Henry VII, in 1511. The foundress having died before her designs were completed, much difficulty was experienced in establishing the college on the scale originally intended, but mainly by the exertions of Fisher, bishop of Rochester, then chancellor of the university, sufficient funds were raised to endow thirty two fellowships. The college now consists of a master, at least fifty six fellows, sixty foundation scholars, and nine sizars, both fellowships and scholarships being perfectly open to all British subjects. The governing body is a council consisting of the master and twelve fellows, elected by the fellows generally. Candidates for the fellowships must be graduates of Cambridge or Oxford. The fellows, except those holding certain offices in the college or the university, vacate their fellowships after six years' tenure. Five fellowships are professorial fellowships to be held by professors of the university under conditions prescribed in the university statutes. There are three divinity studentships of the value of about £80, ten-

able for three years, and open to the competition of Bachelors of Arts not of sufficient standing to take the degree of M.A., also four law studentships of the value of £150 tenable for four years, and a Hebrew scholarship of the value of £32 tenable for three years. Some £6700 are expended annually in assisting deserving students of the college, and there are a number of prizes which are awarded on the results of the annual examinations. The college has the patronage of fifty-two livings. The buildings include four courts chiefly of brick, the new court (1826) is across the Cam and is built of stone. The chapel (1869) is by Sir Gilbert Scott, and is a fine specimen of the early decorated style. The combination room, 93 feet long, and the library (1623), are very curious and striking. The third and new courts are united by an ornamental covered bridge, commonly called the 'bridge of sighs'. Ascham, Ben Jonson, Bentley, Rowland Hill, Wilberforce, Wordsworth, and Lord Palmerston, were members of the college.

SAINT JOHN'S COLLEGE, OXFORD, a college founded in 1555 by Sir Thomas White, Knight, and alderman of London. The original foundation consisted of a president, fifty fellows and scholars, a chaplain, an organist, six singing men, eight choristers, and two sextons. Under the statutes made by the University of Oxford Commissioners the foundation will henceforth consist of (1) Not less than fourteen nor more than eighteen fellowships, of which seven may be official fellowships, the rest tenable for seven years. To these may at future times be added two *ex officio* fellowships to be held by the Laudian professor of Arabic and the professor of civil engineering. (2) Not less than twenty eight scholarships, of which six shall be open, fifteen appropriated to Merchant Taylors' School, two to Coventry School, two to Bristol School, two to Reading School, and one to Tunbridge School. (3) Four senior scholarships confined to former pupils of Merchant Taylors' School. There is also one open scholarship, called the Holmes Scholarship, tenable for five years, and one, tenable for four years, created from the estate of William Lambe. There are four fellowships, tenable for fourteen years, open with certain limitations and under certain conditions in respect of literary proficiency, first to the kindred of the founder, Dudley Fereday of Ettingshall Park, Stafford, secondly to natives of Staffordshire, and then to any other person whatsoever. Under the will of the Rev J. T. Casherd, D.C.L., prebendary of Llandaff, four scholarships of £80 each per annum were founded, also certain exhibitions for undergraduates not on any foundation, and of at least one year's standing in the college. There are thirty three livings in the patronage of the college.

SAINT JOSEPH, a town in the United States, capital of Buchanan county, Missouri, on the left bank of the river Missouri, 168 miles north west of Jefferson City direct, and 340 miles distant from that city by river. It contains a fine court house, city hall, over 20 churches, numerous high and common schools, state lunatic asylum, theatre, opera-house, &c. It is the most commercial and populous town of Western Missouri, and is an important railway centre. It has manufactures of iron, woollens, and carriages and wagons, and several large pork packing establishments. Pop (1890), 52,324, (1900), 102,979.

SAINT JUST, ANTOINE LOUIS LÉON FLORELLE DE, one of the most prominent men in the French revolution, born at Decize, in the department of Nièvre, on Aug 25, 1767, executed July 28, 1794. He adopted with enthusiasm the principles of the revolution. Having been returned to the convention by the department of Aisne, he in the first speech which

he delivered there maintained that every Frenchman had the same right against Louis XVI which Brutus had against Caesar. He was perhaps the most energetic and resolute of the whole party of the Mountain. In his zeal for the cause to which he was attached he did not shrink from the most violent and sanguinary measures to crush his opponents. At the end of 1793 he was made president of the convention, and in the spring of 1794 drew up the accusations against Danton, Héault de Sechelles, and Camille Desmoulins. He fell with Robespierre through the events of the 9th Thermidor (July 27, 1794, see FRANCE—History), and perished on the same scaffold with him on the following day. He was the author of some poems of mediocre merit, and also of some political pamphlets. *Esprit de la Révolution et de la Constitution de France* (1791), *Rapports faits à la Conventions, Fragments sur les Institutions* (1800), and an *Essai de Constitution*. His *Œuvres politiques* were published in 1833–34.

SAINT LO. See **Lo (St)**.

SAINT LOUIS, a town in Western Africa, capital of the French possession of Senegal, on an island of the same name at the mouth of the Senegal. The anchorage in front of the town is good, and on the east there is an easy access for ships. The town contains large warehouses. Pop 20,000.

SAINT LOUIS (US). See **LOUIS (St)**.

SAINT MICHAEL'S MOUNT, a remarkable conical rock on the coast of England, county of Cornwall, on the north west side of Mount's Bay, opposite the town of Marazion. It consists of a vast mass of granite protruding through schistous rocks, and rising gradually from a base nearly 1 mile in circumference to a height of 250 feet. It is connected with the mainland by an isthmus, which is dry at low but covered at high water. On its summit are the remains of a monastery founded by Edward the Confessor, which was subsequently fortified. Its possession was disputed during the Lancastrian and the Parliamentary wars. There is a fishing village at the base of the mount.

SAINT MICHEL, MONT, a fortified rock in the department of La Manche, France, in Cancale Bay, 7 miles south west of Avranches. It has a castle, formerly a house of correction, and an old church of the tenth century. There is a straggling village on the hill, with a population of about 300.

SAINT NAZAIRE, a town of France, department of the Loire Inférieure, situated on a promontory between the right bank of the Loire and the ocean. Previous to 1845 St Nazaire was a small village. Works were then commenced to fit it for serving as an outpost to Nantes, from which it is distant about 38 miles, and a large basin and breakwater were constructed. A second large basin and other works have been constructed, and St Nazaire has now an important trade. Pop (1901), 34,671.

SAINT NEOTS, a market town, England, county of Huntingdon, on the right bank of the Ouse, 9 miles south by west of Huntingdon. It has a spacious market place and a handsome church. The chief industry is the manufacture of paper, and there is an iron foundry. Pop (1891), 4077, (1901), 3880.

SAINT NICOLAS, a town of Belgium, province of East Flanders, 19 miles ENE of Ghent, on the railway from Ghent to Antwerp. The streets are spacious and regular, the market place is one of the largest in the kingdom. The Church of St Nicolas is a handsome edifice. The town has manufactures of cottons, woollens, silks, and numerous minor articles, breweries, distilleries, tanneries, and other works, and a trade in corn, flax, hemp, hops, &c. There are various educational, charitable, and scientific institutions. Pop (1900), 30,464.

SAINT OMER. See **OMER (SAINT).**

SAINTONGE, a former province of France, now mostly in the department of Charente-Inférieure.

SAINT PAUL, a city of the United States, capital of Minnesota, is situated on the Mississippi, mainly on the east side, and occupies heights rising from the river, which is here crossed by five bridges. It is well laid out, has many parks, electric and cable tramways, &c. The chief buildings comprise the state capitol, city hall, government buildings, fine business premises, various educational and benevolent institutions. Besides numerous public schools there are here a manual training college, Hamline University, Macalister College, Concordia College, two Roman Catholic seminaries, &c., and there is also a free city library. The industries are very varied, and the trade is large, the business done extending over a wide area. The city is the centre of numerous railways, and is the head of navigation on the Mississippi. Pop. in 1850, 500, in 1890, 138,156, in 1900, 163,065.

ST PAUL DE LOANDA. See **LOANDA.**

ST PETRESBURG. See **PETERSBURG (ST).**

SAINT PIERRE. See **PIERRE (SAINT).**

SAINTS, persons of extreme sanctity or holiness, in a specific sense, persons whose lives have been deemed so eminently pious that the Roman Catholic Church has authorized its members to pray for their intercession or assistance, as being now in heaven and having power to aid their votaries. The doctrine of saints, and the ideas and usages which grew out of it, their veneration and invocation, the power which they are considered to possess of interceding for men with God and of working miracles, their peculiar patronage of particular individuals, &c., form one of the main points of difference between the Protestants and the adherents of the above mentioned churches. The *Dictionnaire de Théologie* (Toulouse, 1817), a work exhibiting the Catholic faith and defending it against Protestantism, speaks of saints in the following manner:—"The name of saint is given to a person who is not only much attached to the worship of the true God but who is exempt from every considerable vice, and who practises the Christian virtues in an exalted degree, and as the bliss of heaven is the certain reward of such a life we often understand by *saints* those who enjoy eternal felicity. When the church is convinced that an individual has led such a holy and pure life, when God has deigned to attest it by miracles, it places him among the number of saints by a decree of canonization, and authorizes the faithful to render him public worship. (See **CANONIZATION**.) The church, however, does not intend to intimate thereby that such an individual has been exempt from every weakness of humanity, and that he has never sinned, human frailty does not admit of this perfection."

The article from which this definition is taken treats the worship and invocation of saints and their intercession as something essential to the Catholic faith, while there are other Catholic writers who explicitly say that the church has made the worship of saints not a matter of doctrine but simply of discipline. Without further statement of the views of Catholic writers, among whom, as may be imagined, a great many shades of opinion prevail on this subject, from the extreme view, by no means unfrequently maintained, that saints are persons who have led a life so much more virtuous than was necessary to obtain happiness in another state that this surplus of virtue is made operative by their intercession for the salvation of others, down to the other view just mentioned, we refer the reader to the decree of the Council of Trent as the acknowledged orthodox basis of the veneration of saints, images, relics, &c. It

is explicitly stated there that Jesus Christ is the only Redeemer and Saviour, but that it is 'good and useful suppliantly to invoke saints and to resort to their prayers and assistance,' that they pray for men, that their bodies are to be venerated by the faithful, and that the images of Christ, of the Virgin Mother of God, and of other saints, are to be also venerated—"not that it is believed that any divinity or power resides in them on account of which they are to be worshipped, or that any benefit is to be sought from them, or any confidence placed in images, as was done formerly by the Gentiles, who fixed their hope in idols, but that we honour the subjects represented when we kiss their images or uncover our heads before them," &c. This is accompanied with the usual anathema against all who teach or profess contrary doctrines. But so much depends upon the true understanding of the decrees upon these points, and so easy is it to put various interpretations on human language, that we shall give that part of the decree of the twenty fifth session of the Council of Trent which relates to the subject of this article in the original.¹ The Catholic theology has two different words for the veneration of saints, and that of God and the Mediator, the former being called *dulia*, the latter *latría*, and the church must watch that the former does not degenerate into the latter. How much the worship of saints and the great variety of human characters which thus became objects of veneration contributed to the diffusion of Christianity in the middle ages, how it brought Christianity into connection with the fine arts by affording the most copious store of religious subjects to the genius of artists, and how the worship of the Virgin Mary became a very active element in the religion of the middle ages, as it still is a prominent feature in the Roman Catholic faith, would

¹ "Mandat sancta Synodus omnibus Episcopis et cæteris docendi munus curamque sustinentibus ut juxta Catholice et Apostolicæ Ecclesiæ usum a primævis Christianis religionis temporibus receptum sanctorumque Patrum consensionem et sacrorum Conciliorum decreta in primis de Sanctorum intercessionibus, invocationibus, Reliquiarum honore et legitimo imaginum usu, fideles diligenter instruant, docentes eos, Sanctos, una cum Christo regnantes orationes suas pro hominibus Deo offerre, bonum atque utile esse suppliciter eos invocare et ob beneficia impetranda a Deo per Filium ejus Jesum Christum Dominum nostrum, qui solus noster Redemptor et Salvator est, ad eorum orationes, opem auxiliumque confugere illos vero, qui negant Sanctos, æternæ felicitatis in celo fruentes, invocandos esse aut qui asserunt vel illos pro hominibus non orare vel eorum, ut pro nobis etiam singulis orent, invocationem esse idololatricam vel pugnam cum verbo Dei adversarique honori unius mediatoris Dei et hominum Jesu Christi vel stultum esse in celo regnantibus voce vel mente supplicare, impie sentire Sanctorum quoque martyrum, et aliorum cum Christo viventium sancta corpora quæ viva membra fuerunt Christi, et templum Spiritus sancti ab ipso ad æternam vitam suscitanda et glorificanda, a fidelibus veneranda esse, perque multa beneficia a Deo hominibus præstantur ita affirmantes, Sanctorum Reliquiarum venerationem atque honorem non deberi, vel eas aliæque sacra monumenta a fidelibus inutiliter honorari, atque eorum opis impetranda causa Sanctorum memorias frustra frequentari, omnino dammandas esse prout jam pridem eos damnavit, et nunc etiam damnat Ecclesia. Imagines porro Christi, Dei paræ Virginis et aliorum Sanctorum in templis præsertim habendas et retinendas easque debitum honorem et venerationem impertiendam, non quod credatur inesse aliqua in his divinitas, vel virtus, propter quam sint colendæ vel quod ab eis sit aliquid petendum, vel quod fiducia in imaginibus aut figenda veluti olim fiebat a Gentilibus, quæ in idolis ætem suam collocabant, sed quoniam honores qui eis exhibentur, refertur ad prototypa quæ illæ representant ita ut per imagines, quas oculamur, et eorum quibus caput aperimus et procumbimus, Christum adoremus, et Sanctos, quorum illæ similitudinem gerunt, veneremur id quod Conciliorum, præsertim vero secundæ Nicænæ Synodi decretis contra imaginum oppugnatores est sancitum."

be highly interesting to consider, but our limits will not allow it.

The Catholics regard their notions on the subject of saints as supported by different parts of the Bible—for example, 2 Tim. ii. 12, various passages in the Apocalypse, Jer xv 1, 5, Luke xvi. 9—and the writings of many of the early fathers, as Origen, who wrote in the third century (1 de Orat. n. 11, and several other places of the same character), for the invocation of the saints they refer chiefly to Gen. xlviii. 16, John xii 26, xvii. 20, and many passages in early Christian writers. The Protestants object to the whole doctrine, and allege that even Christ himself said, 'There is none good but one, that is, God,' that not only is the idea of saints as intercessors nowhere contained in the Bible, but that it originated centuries after the establishment of Christianity, that it is against the chief doctrine of Christianity, which declares all men to be sinners, and to be saved only by Christ, that it is impious to imagine God like an earthly king who is influenced by the suggestions of those around him, that Christ's mediation, founded on the place which he holds in the Trinity, gives no countenance to this dogma, and that it can be clearly proved that many saints, now so considered, never existed, but were the offspring of ignorance, mistaking, for example, a Greek word in a church inscription for the name of the saint to whom the church was dedicated, and that others were of very equivocal characters,¹ that fraud evidently sometimes had part in the creation of saints, and that a doctrine which has led for centuries, and so universally, to such gross superstitions as Catholics themselves admit have often arisen from the doctrine of saints, notwithstanding these superstitions are not supported by the Council of Trent, must be highly dangerous, for the essential question with regard to every law and doctrine is not, For what was it intended? but, How does it operate? If Protestants do not see that the Bible contains any divine command which could fairly lead to the invocation of saints and to the supposition of their intercession for men with God, still less do they find any ground for the veneration of relics. The doctrine of saints seems to us to have essentially originated from the virtues displayed by the martyrs. Martyrdom always remained the most common ground of saintship, probably from its supposed resemblance to our Saviour, who was made perfect or consummate through suffering. When the gospel had filled the heart of believers with the hope of an eternal life of felicity death soon came to be considered as affording occasion for joy rather than sorrow to the friends of the departed. This opinion has been maintained unqualifiedly by St Cyprian in his treatise De Mortalitate. The anniversaries of the death of friends were celebrated by partaking of the Lord's supper and by a gift laid on the altar, in return for which the prayer for the soul of the deceased was introduced into the prayers which preceded the communion. If this was the case with all it was naturally still more so with the martyrs, whose death was their glory. Hence the anniversaries of their suffering were called the *dies natales, natalitia martyrum, genethlia tōn martyrōn*. We find in Eusebius (lib. iv. 15) the report of the

martyrdom of Bishop Polycarp by the community of Smyrna. They say there, in answer to the reproaches of the heathens, 'They (the heathen) do not know that we can never forsake that Christ who has suffered for all the saved, nor can worship any one besides. Him we worship as the Son of God, but the martyrs we love as they deserve on account of their unparalleled love of their King and Lord,' &c. They continue 'We took up his bones, which are more precious than gold and jewels, and laid them down in the proper place, and God will grant that we may assemble there in joy and gladness and celebrate the festival of his martyrdom in memory of the departed champions, and to exercise and prepare those who are still awaiting the struggle.' In this passage we see already the beginning of the veneration of relics. By degrees the veneration of martyrs and the estimation of their relics increased, and according to the unanimous testimony of the most distinguished fathers of the church of the fourth and fifth centuries they were even then invoked as intercessors at the throne of God. In ages when information is transmitted chiefly by tradition facts easily become exaggerated without intentional violation of the truth, and soon many miracles were reported to have been wrought by their relics or intercession. At the same time it is undeniable that, with the diffusion of Christianity, when danger was no longer connected with its profession, and many persons came over to this religion who had but an imperfect knowledge of it, and had not abandoned entirely their former superstitions, pagan notions often became blended with the new religion, and as many statues of pagan deities were changed into those of martyrs and other persons distinguished for piety, so some hymns, originally addressed to these deities, were now sometimes addressed to departed Christians who had been eminent for piety, and the special protection of certain persons or things, as ships, churches, &c., was attributed to them as intercessors with God. When monarchs became Christians and the persecution of believers ceased, so that instances of martyrdom were no longer found, the retiring from the world to the seclusion of a convent or other great sacrifices made from religious motives often led to investing the deceased with the character of intercessors with God. A pious bishop, who had devoted his whole life to the welfare of his flock, was looked upon as retaining his care for it in the regions of eternal bliss, so that, by degrees, many saints arose, and it naturally happened that this honour was sometimes paid to unworthy persons, and sometimes actual fraud was committed to obtain it. It was not uncommon for a person to be long considered and invoked as a saint when it remained doubtful whether he was so regarded by the church. Hence we find that the council at Frankfurt-on-the-Main (794) prohibited the invocation of new saints, and Charlemagne again, in 805, revived the decree. The pope at last took the matter into his own hands. Pope John XV in 993 gave the first example of a canonization by the Roman see, and Alexander III declared in 1170 that canonization was an exclusive right of the pope, with whom it has since remained.² See CANONIZATION and BEATIFICATION.

Few popes have become saints. Pius V, in 1712, was the first for almost 1000 years, and, so far, has been the last. France, Naples, and the German Empire would not acknowledge the canonization of Gregory VII by Benedict XIII in 1728.

Countries, cities, arts, trades, orders, things, &c.,

¹ Doctor Reuchlin Meldegg Catholic 'professor ordinarius' of ecclesiastical history, and temporary dean of the theological faculty at Freiburg, says, in his *Proposals for Reforms in the German Catholic Church*, 'The old Roman breviary, crammed with fictitious or much coloured anecdotes of saints, with repetitions that weary, with passages of indecorous import, &c., requires a thorough revision.' In another passage he says, 'Some masses are founded on stories not sufficiently proved, or palpable fictions, as the mass of the 'lances Christi,' the 'inventio crucis,' &c.'

² The above mentioned decree of the Council of Trent also guards against the introduction of new miracles, new relics &c. if not approved of by the bishop of the diocese.

have their patron saints; but the church, it seems, determines nothing in relation to them. St Denis is the patron of France, St George of England and Russia, St Andrew of Scotland, St Patrick of Ireland, Olaf of Norway, Cnut or Canute of Denmark, Nepomuc of Bohemia, Cecilia of music, Hubert of hunting, Crispin of shoemakers, &c. The Greek Church does not acknowledge the saints canonized after its separation from the Western Church. See *ACTA SANCTORUM*.

SAINTS' DAYS are days set apart by traditional usage or authority of the church for anniversary celebrations in honour of particular saints. The degree of honour paid to these days differs according to the dignity of the saint commemorated on them, and sometimes according to local circumstances, the patron saint of a church, town, or country receiving special honour from those who are supposed to enjoy his protection. Saints' days were first instituted in honour of martyrs. The day of a martyr's death was called his birth day, and was celebrated accordingly. Saints' days form a special class of the festivals of the church. See *FESTIVALS*.

SAINT-SERVAN, a seaport town of France, department of Ille-et-Vilaine, situated at the mouth of the Rance, a few hundred yards from St Malo, from which it is separated by a narrow arm of the sea, which is now formed into a dock. It has breweries and ship building yards, and manufactures cables, cordage, and sea biscuit. There is a harbour for war-vessels here. Pop. (1896), 9456.

SAINT SIMON, an ancient French family, which claims to derive its origin, through the Counts of Vermandois, from Charlemagne. Louis de Rouvroy, duke de St. Simon, a peer of France, known as the author of the well known *Mémoires*, was born in 1675, and died in 1755. He was brought up on terms of intimate friendship with the Duke of Orleans, afterwards regent, to whom he became warmly attached. He was employed in several diplomatic missions, and was made one of the council of regency under the Duke of Orleans, after whose death, being invited, as the French phrase is, to reside less constantly at Versailles, he retired to his estates. Although a favoured councillor of the Duke of Orleans he did not join in his orgies, and at the court of Louis XIV. his independence had proved adverse to his promotion. As ambassador to Spain in 1721 he negotiated the projected marriage of Louis XV with the Infanta, which was afterwards frustrated by the Duke of Bourbon, the regent's rival. His memoirs, commenced in 1694, while serving in the army, and on which he laboured for sixty years, remained a long time in manuscript, and were afterwards published in a mutilated form, with many suppressions. The first complete edition appeared in Paris in 1829-31 (in twenty-one vols 8vo), under the title of *Mémoires complets et authentiques du Duc de Saint Simon sur le Siècle de Louis XIV., et la Régence, publiés pour la première fois sur le Manuscrit original entièrement écrit de la main de l'Auteur, par M le Marquis de Saint Simon*. The *Mémoires* of St Simon before their complete publication were known to Voltaire, Marmontel, and Duclos. They are the work of a man of high moral principle, ridiculously wedded to court forms and aristocratic notions of precedence, but withal a profound observer, with a large share of political knowledge and sagacity, and a genius for personal portraiture and description. Though often rendered partial by prejudice, he knew also how to distinguish merit even in his adversaries. Chéruel's edition of the *Mémoires* (21 vols, 1873-81) may be mentioned, and also Bayle St John's translation (abridged).

SAINT SIMON, CLAUDE HENRI, COMTE DE, founder of a philosophico-religious sect of socialists,

was born at Paris 17th October, 1760. Born of a family which traced its descent to Charlemagne (see the preceding article), the future social reformer appears to have drawn his early inspiration from a circumstance so little in accordance with his subsequent career. He conceived that his origin destined him to great achievements. The real source of this conviction was probably, however, the consciousness of intellectual power, and it might attach itself arbitrarily to the circumstance of birth as the distinction he had been taught to prize most highly. At the age of thirteen he offended his father by refusing to receive his first communion, because he found himself unable to entertain the appropriate convictions. Before he was sixteen he gave his servant orders to call him in the morning with the summons, 'Rise, M le Comte, you have great things to do.' His education was according to his rank, but, except that he numbered D'Alembert among his masters, it does not appear to have been in any way remarkable. At the age of eighteen he embraced the career of arms, and he served in the closing campaigns of the American war of independence, in which he appears to have distinguished himself. Returning home with the order of Cincinnati, he was made prisoner in the naval combat in which the French were defeated by Rodney, and remained a prisoner at Jamaica till the peace in 1783. On his return he was created a Knight of St Louis, and appointed colonel of a regiment, but after a brief period of garrison duty at Metz, and following a course of mathematical study at Mézières, he abandoned the service in order to travel. He went to Holland in 1785, and to Spain in 1787. Here he conceived a project, which was not carried out, of forming a communication by a canal from Madrid to the sea, and was successful in endeavouring to introduce diligences in Spain. On the outbreak of the revolution of 1789 he joined himself to those who petitioned the assembly for the abolition of titles of nobility. He took no further part in the political movements of the revolution, and it is very remarkable that a man of ability, activity, and ambition should have remained entirely without a political role during so momentous a crisis in the history of his country. During this exciting era St Simon was not, however, without active occupation. He was wholly absorbed in the pursuit of wealth. Speculation in the national domains created by the confiscation of the effects of the nobility and clergy afforded unlimited scope for his ambition. In this career he was joined by another adventurer, De Redern, whom he had known in Spain. Their speculations were at first unfortunate. Redern, a Prussian, was obliged to flee, and St Simon was imprisoned as a nobleman for eleven months. On his liberation he realized a considerable fortune by paying for the property he had acquired in assignats, the market value of which had fallen to 6 francs the thousand, while they were still received at full value in payment of the national domains. It is alleged, however, by St Simon that De Redern, who managed this speculation, kept the greater part of the profit to himself, only giving St Simon 150,000 francs, while he himself realized as much in annual revenue. The disciples and apologists of St Simon endeavour to explain or apologize for this part of his career, by saying that he deemed the acquisition of wealth indispensable to the promulgation of his schemes. This much is certain, however, that thus he was occupied during a period when much more than even schemes of social reform was at stake, and when the honour and integrity of the country itself were imperilled by the very measures on which his speculations were based. It would appear, nevertheless, that even at this time his projects were not wholly

those of personal ambition. During his imprisonment his mind was filled with schemes for healing the divisions which had broken out among the different classes of men. The enthusiastic character of his speculations may be guessed from a vision which he thus narrates, 'At the most cruel epoch of the revolution, and during my detention at the Luxemburg, Charlemagne appeared to me and said, "Since the world exists no family has enjoyed the advantage of producing a hero and philosopher of the first order. This honour was reserved to my house. My son, your success as a philosopher will equal mine as a warrior and statesman."' A man who could obtain such visions as this can hardly be held responsible for the management of his private affairs, but that management must be measured by ordinary rules if we would rightly estimate the value of the judgment on which his speculations are founded. In order to fulfil the mission which he had thus acquired he became in his thirty-eighth year a student of science, resided opposite the Ecole Polytechnique, and subsequently the Ecole de Médecine, in order to enjoy communication with the professors, whom he invited to his table.

He married in 1801 Mlle de Champgrand, and in the course of a year, which he devoted to acquiring wisdom in the experimental manner attributed to Solomon in Ecclesiastes, he ran through his fortune. After this he parted with his wife by divorce. Two curious stories are told of this period, which are sufficiently characteristic to be worth mentioning. According to one account, after the death of M de Stael and his own divorce, which he procured expressly on the occasion, according to another, before his own marriage and M de Stael's death, he visited Mme de Stael at Coppet, and offered her marriage, or proposed that as she was the most extraordinary woman in the world and he the most extraordinary man, they should have a child which would doubtless be more extraordinary still. The other story is, that being unable to procure children by his wife he wished to have them by proxy, and believing that the moral character of the children depended on that of the parents, he selected an eminent mathematician to recommend to his wife, who followed his advice, and had a son, who did not at all answer to his expectations. In 1802 and 1803 he travelled in England and Germany, without, as he says, acquiring any new experience of importance. During his stay at Geneva he produced his first work, *Lettre d'un habitant de Genève à ses Contemporains*. He proposed that the *sarants* should be maintained at the public expense, that spiritual power should be in their hands, temporal in that of the proprietors, while the 'great chief of humanity' should be elected by the masses. Religion, he observed, was merely a human invention. Having exhausted his means he obtained the post of a clerk at the mont de piété, the fatigue attendant on which wore out his health. At this time he encountered Diard, to whom he had been attached since 1790, and whom he calls his only friend. This associate not only took on himself the charge of his maintenance, but provided means for the publication of his next work, *Introduction aux travaux scientifiques du dix neuvième siècle* (1807), in which he insists that sufficient experiments had already been accumulated in science to enable us to lay aside analysis, and proceed by induction to general results. In the *Prospectus d'une nouvelle Encyclopédie* (1810) he endeavoured to show that an encyclopædia signified a concatenation of sciences, and that the proper order of such a work was one in which the details of human knowledge should be presented in the sequence of their concatenation. The death of Diard in 1810 plunged him again into want, and having written

two works, *Sur la science de l'homme*, and *Sur la gravitation universelle*, he found himself without means to publish them. He addressed copies of them to various savants, with an urgent request for assistance, attributing his poverty to his disinterested studies for the public good. Among other expedients he presented his work on gravitation to the emperor, with the alternative title of *Moyen de faire reconnaître aux Anglais l'indépendance des pavillons*. This title, of which his disciples have failed to give any explanation, did not succeed in attracting the attention of the emperor. The privations he subsequently endured brought on a serious illness, during which he was tended by his family at Péronne. On his recovery he returned to Paris Augustin Thierry, who from this time became his intimate disciple, co-operated in editing his work on the Reorganization de la société européenne (1814), in which he endeavoured to demonstrate the uselessness of the Congress of Vienna, and to show that a European parliament, with the right to determine differences between different nations, was the only means of preserving general peace, and for the promotion of this he advocated union between England and France. The last proposal, perhaps the most sensible he had yet made, caused him to be regarded as a madman, but this was his first work which attracted general notice. It was followed by another, prepared with the collaboration of Thierry, *Opinion sur les mesures à prendre contre la Coalition de 1815* (1815). In 1817 and 1818 he published *L'Industrie ou Discussions politiques, morales et philosophiques*, in the first volume his collaborateurs were Thierry, whom he called his adopted son, and Saint Aubin, Thierry afterwards abandoned him, and was replaced by Auguste Comte, to whom the third volume is specially attributed. In 1819 he produced a work more decidedly socialistic in its tendencies under the title of *Parabole*. Finding the difficulty of procuring the means of subsistence and of publishing his works increasing he resolved in 1823 to put an end to his existence. He shot himself with a pistol loaded with seven balls, but none of them entered his brain, and after protracted suffering he recovered with a mutilated visage and the loss of an eye. Shortly after this Auguste Comte left him, and was replaced by other disciples. In these circumstances he produced his last work, *Le Nouveau Christianisme* (1825), to which he owes his position as the founder of a sect. Christianity he now averred to be a progressive system, which had been rendered immovable by the bonds of ecclesiastical law. Taking its fundamental principle of love he held the church to be a complete organization of society for ministering to the wants of the whole, and especially of the more numerous and poorer classes. A social hierarchy based on capacities and services, with authority to divide heritages, distribute salaries, regulate vocations, and take all necessary means for making the labour of all contribute to the common good, was deduced from these premises by his disciples, among whom may be mentioned Olinde Rodrigues, Léon Halévy, Bailly (de Blois), and Duvergier. Saint Simon himself was approaching his end, but to the last he continued to develop and promulgate his views in a periodical publication, *Le Producteur*. He died 22nd May, 1825.

The disciples of Saint Simon rapidly grew into a sect, and were joined by other eminent men. They attempted to idealize the life of their founder, and make it a consistent whole, dominated from the first by the idea of the mission he was to accomplish. Society was divided by the St Simonian doctrine into three classes, priests, savants, and labourers, and was to be governed by the chiefs of

the three classes. Capacity was to be the ground of distribution of functions. All property was to become on the death of the proprietor the property of the church or society. All children were to receive a general education till their particular capacities became manifest. The Producteur soon died for want of funds, but the society acquired a new impulse after the revolution of July. Numerous converts were made, funds were collected, and the *Globe* newspaper was purchased to disseminate their views. The society was constituted under the leadership of Enfantin and Bazard, who were called *pères suprêmes*, families were organized, and churches and schools established. But it soon appeared that the views of the leaders were divergent, and in 1831 the society broke up into sections, of which four were headed respectively by Enfantin, Bazard, Rodrigues, and Carnot. The sect at first claimed to be a religion, and demanded for its priests exemption from military service, but this claim was rejected by the courts. Among the doctrines of development adopted by the St Simonists was the assigning of a political status to women. Enfantin declared that the moral law could not be revealed without the co operation of both sexes, and that the advent of a woman was to be waited for to complete the *couple révélateur*. Perhaps this want might have been supplied if the marriage *manqué* with Mme de Staël had been accomplished. St Simonism with other forms of socialism came again into temporary activity during the revolutions of 1848 and 1871. The direct influence of such speculations is necessarily limited to brief periods of social excitement, as their impracticability is soon discovered when they are put to the test, but their worst effects are those produced by their dissemination in a theoretical form. Men of superior intelligence who have made social and political science their special study have not seldom made concessions to impracticable theories on the reconstruction of society inconsistent with sound reason, and perhaps more mischievous than an open advocacy of the most extreme views. The value of such concessions is always overestimated in popular opinion, because it is not commonly suspected that there is to the students of social science a special snare in even the most purely speculative remedies for known evils. The difficulty of grappling with social problems is so great that an intimate acquaintance with them is apt to breed a hopelessness of ordinary solutions, which makes the mind turn readily for relief to anything that promises to sweep away any of the ordinary conditions of the problem. Hence there is a predisposition to widen the problem, which often leads to concessions which competent observers less preoccupied with the special difficulty can readily perceive to be ungrounded. But there are multitudes who are deeply interested in social questions who have no special qualifications for judging of them, or whose avocations preclude them from acquiring the necessary training for doing so. The situation of the majority of these masses predisposes them to social change, seeing that the main burden and hardship of the existing social organization falls on them. Many are easily led to extreme views by any sort of plausible leaders, but when men whose judgment is at all deferred to, and who are supposed to have given special attention to such topics, give any measure of countenance to the dreams of visionaries the unsettlement of opinion spreads wide, and assumes a diversity of form sufficient to bewilder even men of solid judgment, and if the very framework of society is not endangered, its ordinary pursuits are disturbed, and it is only after much misery that men are taught by experience to yield to more sober views. Nothing can, therefore, be more mischievous than the indul-

gence often extended to the views of visionaries on account of their philanthropic aims. St Simonism is simply an attempt to render men benevolent by external regulations, to do the work of Christianity without its authority and without its weapons. See the edition of the works of Saint Simon and Enfantin in 47 vols (1865-78), Booth's *Saint Simon and the Saint Simonians* (1871), Janet's *Saint Simon et le Saint Simonisme* (1878), Weill's *Un Précurseur du Socialisme* (1894), Warschauer's *Saint-Simon und der Saint Simonismus* (1892), Weill's *L'Ecole Saint-Simonienne* (1896), Charlety's *Histoire du Saint Simonisme* (1896), &c

ST THOMAS (Africa) See THOMAS (ST)

ST THOMAS (West Indies) See THOMAS (ST)

SAINT THOMAS CHRISTIANS OF See CHRISTIANS OF ST THOMAS

ST VINCENT (West Indies) See VINCENT (ST)

ST VINCENT, CAPE See VINCENT (ST), CAPE

SAIS, a ruined city of Egypt, near the right bank of the Rosetta branch of the Nile, 67 miles north west of Cairo. It was a place of great importance during the reigns of the Saite kings, who ruled Egypt about 150 years, until the Persian invasion under Cambyses. Sais was the place where the fete of burning lamps was particularly celebrated, and to which strangers resorted from different parts of Egypt to assist in the ceremony.

SAJOU, a synonym of Sapajou (which see)

SAKER, a name formerly used for a small species of cannon

SAKHALIN See SAGHALIEN

SAKHARA, the necropolis of ancient Memphis, from whose ruins it is about 2 miles distant, on the edge of the Libyan Desert. It is remarkable for its ancient monuments, among which are thirty pyramids, besides the ruins of a great number, and numberless grottoes, sarcophagi, the ibis catacombs, tombs of Apis discovered by Mariette, &c

SAKI, a name given to various species of Platyrrhine or New World Monkeys, allied to the Sapajous (which see), but differing from the latter forms in possessing non-prehensile tails. The tails of the Sakis are covered with long bushy hair, and they are hence sometimes termed 'Fox-tailed Monkeys'. They are forest dwellers, and are gregarious and nocturnal in habits. Their chief dietary consists of honey and fruits. The Sakis are gentle and timid in disposition, in fact, their timidity renders their domestication a matter of difficulty.

The Sakis fall into two divisions, in the first of which, that of the true Sakis, the tail is as long as the body. Some of these forms possess a beard, and long hair on the head as well. The Bearded Saki or Cuxio (*Brachyurus Satanus*) exemplifies these peculiarities, and other species are the Hairy and Capuchin Sakis. Of the second division—Brachyures or Short-tailed Sakis—in which the tail is short and the head bald, the Cacajao or Brachyurus (*Pithecia melanocephala*) is a familiar form. These latter forms occur on the banks of the Upper Amazon, in Peru, and in Brazil. The *P. leucocephala*, or White-headed Saki, is another species of this latter genus.

S'AKUNTALA, a female personage of Hindu mythology, the subject of an episode of the Mahābhārata, and the heroine of a drama by Kālidāsa. (See KALIDASA.) According to the Hindu mythology the *rishis* or sages are tempted during their protracted periods of penance by heavenly nymphs of surpassing loveliness called Apsarasas. These tempters are sent to prevent the sages from acquiring too great power through their austerities. The Apsaras Menakā was sent by Indra for this purpose to the rishi Viśvāmitra, and he had by her a daughter whom he called S'akuntalā. But after living for

some years in connubial bliss with Menakâ Viswâmitra returned to his penances, and Menakâ went back to heaven. Deserted by both her parents Sâkuntalâ was taken care of by the rishi Kan'wa, who lived in a hermitage situated in a forest to the south of Hastinâpura, where reigned the princes of the Lunar line. When hunting in the forest King Dushyanta fell in with Sâkuntalâ, and persuaded her to marry him according to the rites of the Gandharvas, the celestial husbands of the Apsarasas. He then returned home, having promised to recognize her as his queen, and make her son his heir. The drama turns on the fulfilment of this promise, which was decreed by the celestials. The son of Sâkuntalâ became the founder of the race of the Bhâratas, called after his own name.

SÂL, the common name of *Shorea robusta*, one of the most valuable timber trees of India (see INDIA—Forests). It belongs to the order Dipterocarpaceæ. It yields a hard, heavy, dark brown, close grained wood which is highly valued for many purposes. A kind of resin is also obtained from the sâl, which is one of the trees protected by the Indian government.

SALAAM (Hebrew, *shalom*, Arabic, *seldm*), 'peace be with you,' the common salutation among Mohammedans. The answer is, 'On you be peace and the mercy of God and his blessings.' It is improper to address this answer to any but a believer.

SALAD (French, *salade*, from Latin, *sal*, 'salt'), a preparation of uncooked herbs usually dressed with salt, vinegar, oil, and spices, and eaten either alone or as a relish with other food. Chopped meat, as chicken, lobster, crabs, prawns, or shrimps, or hard-boiled eggs chopped, frequently forms part of a salad. The vegetables chiefly used for salads are lettuce, celery, cresses, radishes, endive, beet-root, with onions and other flavouring herbs. The selection of vegetables is entirely according to taste and season. Lettuce or endive, with a few slices of beet root and a few young onions, is a very common salad in Great Britain, but frequently a much greater variety of vegetables are used together. The following recipes are from Dr Walsh's English Cookery Book—Add to a well washed lettuce two beet-roots carefully washed and boiled, a stick of celery cut small, radishes if in season, mustard, and cress, with the white of a hard-boiled egg, of which the yolk has been used in the salad dressing. *Lobster salad*. Mix with some ordinary salad mixture the boiled eggs of a lobster, then put in a salad bowl a layer of salad herbs, lettuce being the best, upon these strew pieces of the flesh and interior of the lobster itself, with some of the eggs, then another layer of herbs, upon which place more lobster and eggs, and upon this pour the salad dressing, taking care to run it gradually over the whole, lastly, on the top of all place a few of the best leaves of the salad, shred very fine, and round the edge place some ornamental cuttings of cucumbers, radishes, &c. *English salad mixture*. Beat a raw egg with a tea-spoonful of salt until it is thoroughly smooth, then incorporate with it a tea-spoonful of mustard made rather thicker than usual. When these are quite smooth add one, two, or three table-spoonfuls, or even more, of good salad oil, taking care to blend each portion of it with the egg before adding more. Dilute with vinegar till it assumes the consistency of a thick cream. This has the advantage, to those who do not like the flavour of oil, of converting the oil into an emulsion. In preparing a French salad mixture the oil and vinegar, with the requisite condiments, are simply mixed together and poured on the salad.

SALADIN, or properly **SALAH-ED-DIN YUSSUF IBN-AYUB**, a celebrated Sultan of Egypt and Syria, was born in the year 1137 in the castle of Tekrit, of

which his father, a native of Kurdistan, was governor. In 1163 he accompanied his uncle Shirkuh to Egypt on military service under the Sultan Nureddin. In 1166 he defended Alexandria against the Franks. On the expulsion of the Franks in 1168 Shirkuh became vizier to the Fatimite caliph, whose authority was nominal, his real superior being the Sultan Nureddin. He died the same year, and bequeathed his authority to his nephew. He terminated the dynasty of the Fatimite caliphs by a simple decree at the command of Nureddin in 1171. Thereafter he resisted the demands of his superior for military assistance, and virtually made himself independent. Nureddin was preparing to enforce his demands by arms when he died in 1173. His son Malek-el-Saleh, a minor, was unequal to the weight of a contest with Saladin, who made himself master of Damascus in 1174, defeated Malek in two battles, extorted from him the cession of Southern Syria, and assumed the title of sultan. Saladin now made rapid progress in extending his dominion over Syria and the neighbouring countries, but sustained a disastrous defeat from the Crusaders in Palestine under Reginald de Chatillon in 1177. He retired for some years to Egypt, but returning to Syria in 1182, and resuming his career of conquest, he subdued the whole country with the exception of the Latin kingdom of Jerusalem. The great object of his policy was now to expel the Christians from Palestine, and to recover the city of Jerusalem. An atrocious massacre of Mohammedan pilgrims by Chatillon added to his ardour, and his vow of revenge against the perpetrator he was enabled to make good by his famous victory on the Plain of Tiberias in 1187, where he captured Guy de Lusignan, king of Jerusalem, Chatillon (whom he cut down after the battle with his own scimitar), and many more. The fruits of this victory were the towns of Acre, Said, and Beyrout, after which he laid siege to Jerusalem, which yielded (1187) in a capitulation, to the articles of which Saladin faithfully adhered. He then proceeded against Tyre, but failed in consequence of the destruction of his fleet by the Franks. The intelligence of the loss of Jerusalem reaching Europe produced the crusade under the Emperor Frederick Barbarossa (see FREDERICK), whose death inspired the Mussulman with hopes which were soon damped by the arrival of the forces of Richard Cœur-de-Lion of England, and of Philip Augustus of France. The recovery of Acre by the two kings took place in 1191, upon which event Philip returned to France, and Richard, after twice defeating the sultan, took Caesarea and Jaffa, and spread alarm as far as Jerusalem. At length a truce was concluded between Richard and Saladin (1192), by the terms of which the coast from Jaffa to Tyre was ceded to the Christians, whilst the rest of Palestine remained to the sultan. The departure of Richard freed Saladin from his most formidable foe. This active and able prince soon after died at Damascus (4th March, 1193), in the fifty-sixth year of his age. Though chargeable with unjustifiable means of acquiring power, Saladin employed it, when obtained, usefully for his subjects, whose burdens he lightened, whilst he benefited them by many useful works and establishments. Magnificent in his public undertakings he was frugal in his personal expenses. In religion he was zealous for his creed almost to fanaticism, but faithful to his engagements. A lasting proof of the terror which his name inspired was given by the Saladin Tenth, imposed by the authority of Pope Innocent X. on clergy and laity, for the support of the holy war. Saladin left a family of seventeen sons and one daughter, and was the founder of the dynasty of the Ayoubites.

SALAMANCA, a city in Spain, Leon, capital of a province of the same name, 120 miles west north-west of Madrid, on three hills on the right bank of the river Tormes, which is here spanned by a fine Roman bridge of twenty six arches, 500 paces in length and 12 paces in breadth, said to have been rebuilt by Trajan. The houses are, with few exceptions, old fashioned, but generally commodious and well protected from the cold, which is here felt with great keenness. The great square, the largest in Spain, is surrounded with colonnades, under which are shops, the post office, and the town house, and in another square near it is the picturesque vegetable-market. Among the numerous edifices which adorn Salamanca, and which have procured for it in Spain the appellation of Little Rome, are the cathedral, a splendid example of the florid Gothic, begun in 1513, with beautifully enriched portal, and three aisles, the roof studded with gilded rosettes, and supported by graceful shafts with small capitals painted in blue and gold, the old cathedral, erected in 1102, a simple and massy structure in the Norman French style, but low, damp, and neglected, the College of St Bartholomew, or Old College, founded in 1410, but renovated in 1760, a classic edifice, with a grandiose Ionic portico, the College of the Jesuits, that of the military orders of Calatrava, with a noble façade, King's College, with a serious and simple Doric quadrangle, partially restored from the ruinous state in which it was left by the French, and now converted into infantry barracks, the College of the Archbishop, founded in 1522 by Alonzo de Fonseca, archbishop of Toledo, and on which Pedro de Ibarra, Alonzo de Covarrubias, and Berruguete, the three great artistic architects of their age, were simultaneously employed, it is a colossal and sumptuous fabric, with a magnificent façade, the principal court is particularly noteworthy for its double gallery of light, airy, fluted columns, and the elegance and delicacy which reign throughout. It has a beautiful chapel with sculptures on the high altar by Michael Angelo and Berruguete. It is in good preservation, and is now occupied chiefly by the Irish students and a military hospital. Of the numerous conventual establishments the most remarkable is that of St Domingo, a sumptuous building combining various styles of architecture, with a chapel entirely in the modern Gothic style. The University of Salamanca is one of the oldest and most celebrated in Europe. It was founded in the thirteenth century, and a century later was resorted to from all quarters, the number of students amounting at one time to 14,000, and its fame continued to increase till the sixteenth century, after which it began to decline, and now it has several rivals in Spain. The university consists of two edifices, called greater and lesser schools, begun in 1415 and finished in 1433, for up to that time the schools were kept in the old cathedral cloisters, the cloisters of both are fine, those of the latter having graceful arches and elaborate mouldings, and those of the former being remarkable for chaste and elegant simplicity. Philosophy, general literature, chemistry, physics, political economy, jurisprudence, natural history, Greek and Latin, &c., are taught in the university. There are, besides, twenty four parish churches, few of them possessing any architectural beauty, numerous primary schools, a normal school, and a school of design, a theatre, a bull arena capable of accommodating 8000 persons, an asylum for the poor, a foundling hospital, an hospital for the sick, and several other charitable institutions. Many of the private houses and palaces are also remarkable either for their size and massiveness or for their elegance, those most distinguished are the

palaces of the Marquis of Valdecarzana and the Counts Garcigrande, Maldenados, Espinosa, and Monterey. Salamanca possesses manufactures of leather, ordinary cloths and excellent blankets, four manufactories of coarse hats, several of coarse earthenware, and four flour mills, and a trade in wheat, barley, vetches, and dressed leather. *Salmantica*, as the town was anciently named, was an important city of the Vettones. In 222 B.C. it was taken by Hannibal. Under the Romans it became the ninth military station on the road from Merida to Saragossa, and was under the Goths a favoured city. It was ravaged by the Moors, and finally reconquered in 1095. In 1484-86 Columbus was lodged in the Dominican Convent, the monks having espoused his scheme of discovery after it had been condemned by the university. Several provincial councils were held here in the fourteenth and fifteenth centuries. In 1543 Philip II was married here to Mary of Portugal. A famous battle was fought in this neighbourhood in 1812 (July 22) between the French army under Marmont and the English and Portuguese commanded by the Duke of Wellington, when the latter obtained a complete victory. Pop (1887), 22,199.—The province of Salamanca, bounded north by Zamora, east by Valladolid and Avila, south by Caceres, west by Portugal, contains 4940 square miles, the greater portion of which is covered by forests. The soil is fertile, and among the minerals are gold, copper, lead, and iron. Pop (1897), 317,005.

SALAMANDER, the name given to various species of lizard like animals included in the class Amphibia (along with Frogs, Toads, Newts, &c.), and in the order *Urodela* ('tailed') of that class. The family Salamandridæ includes, besides the typical salamanders (*Salamandra*), the Spanish salamander (*Chioglossa*), the newts (*Molge* or *Triton*), the spectacled salamander (*Salamandrina*), the axolotls (*Amblystoma*, &c.), and other genera.

Of the Land Salamanders the best known is the Spotted Salamander (*Salamandra maculosa*), found generally throughout the European continent, but especially in its southern or warmer parts. This form possesses a ground colour of black, spotted with yellow. The sides bear numerous small prominences or tubercles. The food consists of insects, slugs, and similar fare. In winter these forms hibernate, and pass the cold season in holes in trees, beneath stones, or among moss. This species is almost wholly terrestrial in habits, entering the water only in the pairing season. The young are usually born alive, but occasionally eggs are laid. These animals in former days, were believed to possess poisonous properties. It is almost needless to remark that the supposition had no foundation whatever, and that it took origin clearly from the innate horror with which the ignorant, credulous, and superstitious regarded these and many other creatures, which do not present much or any beauty of form. The liquid secreted by the skin glands of this and allied species is certainly of an acrid nature, but is not poisonous or venomous in any sense. The old legend that salamanders could safely live in the midst of fire is, of course, also destitute of truth, although it is possible that the watery secretion of the skin might enable these animals to resist the heat with impunity for a longer period than other forms. Another familiar species of salamander is the *S. atra*, which inhabits mountains at a considerable altitude. The Spectacled Salamander (*Salamandrina perspicillata*) has only four toes on each foot. It is a slender little animal about 4 inches long, and is found in Italy and Sardinia. See the plate at BATRACHIANS.

Of the Tritons or Water Salamanders, by far the most familiar is the Common or Crested Newt (*Molge cristata*), also shown on the plate

The name of Giant Salamander of Japan is given to an amphibian also belonging to the order Urodela, but included in the Perennibranchiate section, or in that in which the gills or gill openings of early life are retained throughout the entire existence. In this case, therefore, the animal is adapted for a true aquatic life, and is scientifically known as the *Megalobatrachus maximus* (see the plate at BATRACHIANS). It is said to be rare in Japan, and is found in the pools and lakes of the basaltic mountains of the interior. It averages from 30 to 36 inches in length, and is of repulsive appearance. The food consists of fishes and other animal matter. The head is large, flattened, and toad like, and together with the body is covered with warty protuberances. The eyes are of very small size. The skeleton discovered in the Miocene beds of Eningen in 1726, and supposed at first to be that of a man who had perished in Noah's flood, is a fossil skeleton of a large salamander allied to the Giant Salamander of Japan. The fossil has been named *Andrias Scheuchzeri*, but it was at first named *Homo diluvii testis*, in allusion to its supposed human origin. The name Japanese Salamander is given to the *Onychodactylus Japonicus*, remarkable as developing nails or claws on the toes during the breeding season and in the larval state.

SALAMANDER. See GABALIS AND GNOME

SALAMIS, or KOLURI, an island of Greece, in the north of the Saronic Gulf, about 10 miles east of Athens. It is of very irregular shape, nearly 10 miles either way north to south, and east to west, and by its opposite extremities, which are separated from the mainland by narrow, winding channels, closes in the beautiful Bay of Eleusis, so as to give it the appearance of a lake. It has a rocky surface, with a thin but not unproductive soil, and in some parts is well adapted for the olive. Its other principal product is honey, but the vine thrives well, and might with due care produce excellent wine. The old city of Salamis stood on the south coast, facing the island of Egina, and the celebrated battle, B C 480, in which the vast and unwieldy Persian fleet was signally defeated by a much smaller Grecian fleet, was fought chiefly in the narrow eastern strait.

SAL AMMONIAC See AMMONIA

SALANGANE, or HIRUNDO ESCULENTA. See BIRD'S NEST

SALE, GEORGE, oriental scholar, was born in 1680, and died in 1736. He was a lawyer by profession, and was connected with the Society for the Promotion of Christian Knowledge. He was a contributor to the Universal History along with Psalmanazar and others, and to the General Dictionary, based on Bayle. He is best known by his translation of the Koran, which appeared in 1734, and is still the standard version. Sale's Preliminary Discourse has been twice translated into French.

SALEM See JERUSALEM

SALEM, a city and seaport, Essex county, Massachusetts, United States, on a peninsula nearly surrounded by water, and on the Boston and Salem Railway, about 14 miles NNE of Boston. Its site, though low, is pleasant and healthy, being formed by two inlets of the sea, the one of which, called the North River, is connected with Beverly by a bridge nearly 1500 feet long, while the other, called the South River, is the harbour. It consists, for the most part, of angular and winding streets, lined with houses built partly of brick and stone, but chiefly of wood. Many elegant houses have been erected in the vicinity of the Common, an inclosure of above 8 acres in the east part of the town, tastefully laid

out in gravel walks, bordered with lofty trees. Among the public edifices are about twenty churches, several of them possessed of much architectural merit, and one, called the North Church, distinguished by its beautiful Gothic front, the city hall, with a fine front of granite, the court-house, a new and beautiful structure, finely situated, the custom-house, market house, alms house, hospital, the Athenaeum, occupying a spacious hall, and possessed of a library of 11,000 vols., the Essex Institution, designed to promote the study both of natural and civil history, the aqueduct, by which an ample supply of soft and spring water is furnished, and the museum belonging to the East India Marine Society. The manufactures are of considerable extent, and include a large steam cotton mill, chemical works, candle works, rope works, several distilleries, and numerous tanneries. The shipping trade has always been important.

Salem was first settled in 1626, and is, next to Plymouth, the oldest town in New England. In 1692 strange delusions with regard to witchcraft having become prevalent, no fewer than nineteen persons were condemned and hanged as witches, on a spot which still bears the name of Gallows Hill. During the revolutionary war Salem distinguished itself by its naval prowess, and fitted out about sixty armed privateers, manned by 4000 men. Pop (1880), 27,563, (1890), 30,801.

SALEM, a district and town of Hindustan, in the Presidency of Madras. The district is bounded west and south west by the Kaveri River, separating it from Coimbatore, north by Mysore and the district of North Arcot, east and south by South Arcot and Trichinapali. Area, 7653 square miles. It consists partly of a tract below the Gháts, but chiefly of the Barramahli Plain above them, a fine table land rising in many parts to between 5000 and 6000 feet above the sea, well cultivated, and producing great quantities of teak, sandal, and rosewood, cedars, bamboos, &c. About one third of the surface is cultivated, and three-fourths are under the ryotwary settlement, the remainder being in small zemindaries. Half of the population is estimated to be employed in agriculture. Cotton of various species, indigo, tobacco, coffee, maize, and rice are raised, iron ore is very abundant and rich, and some of it magnetic, native carbonate of magnesia is met with, cotton cloths are, or lately were, made for export to the West Indies and America, iron and steel are manufactured, the chief exports are cloth, ghee, grain, iron, and oil-seeds, imports, areca, pepper, and silk. Salem contains 3972 villages. Pop 1,599,595—Salem, the capital and only town of importance, is in its south part, 70 miles NNW of Trichinapali. It consists of two wide, and many narrow streets, with numerous houses built of brick and tiled, and it is on the whole clean and improving, but not salubrious, from being seated in a narrow valley, and subject to great daily ranges of temperature. Many of the inhabitants are silk and cotton weavers, and these are the most healthy. Pop (1891), 67,710, (1901), 70,627.

SALEP is obtained from the tuberous roots of one or more species of orchis, and is usually imported from Turkey and other parts of the Levant, though it may be prepared in any part of Europe, from many common species of orchis. The process consists simply in washing the roots, and rubbing off the brown skin, when they are dried, and afterwards ground into powder. This powder, as an article of diet, is esteemed highly nutritious, containing a great quantity of farinaceous matter in a small bulk. The roots are dug up as soon as the flower-stalks begin to decay, and the newly formed bulbs, which have then attained their perfect state, are separated.

An ounce of this powder and an ounce of portable soup, dissolved in 2 quarts of boiling water, will form a jelly capable of affording sustenance to a man for a day, consequently, it is of great use in long voyages, or travels by land.

SALERNO (anciently, *Salernum*), a town and seaport of South Italy, capital of the province of the same name, at the north extremity of the gulf of its name, 30 miles south east of Naples, finely situated on the side and at the foot of a hill, crowned by the remains of an ancient citadel. It has a broad road or *marina* (called the *Corso Garibaldi*), $1\frac{1}{2}$ mile in length, along the shore, which forms an excellent promenade. Its streets, paved with lava, are narrow and irregular, and hemmed in by lofty, gloomy looking houses, very indifferently built. The principal edifices are the cathedral, erected in 1084 by Robert Guiscard, restored in 1768, a Gothic structure, adorned with a façade of twenty eight granite Corinthian pillars, and possessing an ancient tomb, said to contain the ashes of the Apostle Matthew, the governor's palace, the new theatre, many churches, several convents, an ordinary and a foundling hospital. The port is well sheltered, but is shallow, and frequented chiefly by fishing vessels, Naples having carried off its trade, which was at one time of some importance. Salerno is the see of an archbishop, and has a high criminal and a civil court, a seminary, and lyceum. The foundation of the town is attributed to the Greeks. It became a place of great importance under the Romans, from whom it passed first to the Goths and afterwards to the Lombards, who retained it in possession till the eleventh century, when they were expelled by the Norman, Robert Guiscard. It was ultimately annexed to the crown of Naples. In the middle ages it was celebrated for its school of medicine, which was raised to the rank of a university about 1150. The university was abolished in 1817. Pop (1881), 23,010, (1901), 42,736.

SALES, SAINT FRANÇOIS DE, Bishop of Geneva, was born of noble parents at the castle of Sales, near Annecy, in Savoy, 1567, was carefully educated, and in 1578 proceeded to Paris, where he was placed under the care of the Jesuits. He afterwards studied law at Padua (1584-91), and on leaving it with a great reputation for piety and learning, travelled over part of Italy and then returned home. He obtained the appointment of counsellor in the senate of Chambery, and was intended by his father for a secular life, but his own inclinations for the church were so strong that his father ultimately gave way, and he was allowed to take orders. His first appearances in public gave promise of his great success as a pulpit orator. He was also most diligent in the discharge of his pastoral duties, and soon acquired a very high reputation. In 1594 he undertook a mission to Geneva, in the hope of regaining converts from Protestantism. In that part of the Genevese territory which had been recaptured by the Duke of Savoy, and where other influences than conviction were at work, he was not unsuccessful, but Geneva itself was not so easily reconquered, and an attempt made on no less a personage than Theodore Beza, though backed with the promise of a pension of 4000 crowns, was as unavailing as it deserved to be. On his return to Annecy in 1596 he was rewarded with the appointment of coadjutor to the titular Bishop of Geneva, an appointment, however, which, with the greatest disinterestedness, he for some time declined. In 1602 he paid a visit to Paris, and preached a course of sermons in the chapel of the Louvre, which not only produced a great sensation, but gave several leading Calvinists an opportunity of imitating their royal master, and declaring them-

selves reconverts to Romanism. On his return he became, by the death of his colleague, sole Bishop of Geneva, and drew up a set of rules for his guidance. These are highly creditable to him, inasmuch as they prove that he attached much more importance to the faithful discharge of duty than to mere ascetic observances. One excellent proof of his zeal was given in 1605, when he commenced an effectual reform of the monasteries in his diocese. In 1606 he again visited France, and preached a series of sermons at Dijon, where he is said to have gained some converts from Calvinism. Such was now his repute that Pope Paul V applied to him for his views on the agency of divine grace in connection with free will. This was dangerous ground both for pope and bishop, as the same question had repeatedly endangered the unity of the Roman Church, and in particular had been the subject of fierce controversy between the Dominicans and Jesuits, but François de Sales managed adroitly enough to avoid giving offence by writing so ambiguously as to make it impossible to say which side he was most inclined to favour. In another work, published about the same time, he was more successful. It is entitled *Introduction to a Religious Life*, a subject with which he had long been practically acquainted, it is written in a simple, earnest style, which has secured it a lasting popularity, though by the multitude and nature of its metaphors it often sins egregiously against good taste. In 1610 he founded a female religious order called the Order of the Visitation, and placed at the head of it Madame de Chantal, whose letters to him are written in a spirit of fervour which, it has been alleged, though apparently on insufficient grounds, breathes an affection something stronger than Platonic. In 1618 increasing infirmities obliged him to seek the assistance of a coadjutor in his bishopric, and on Dec 28, 1622, his useful life was suddenly terminated by a paralytic stroke. In 1665 he was canonized by Pope Alexander VII, an honour which he had merited by better titles than many of his fellow saints. His life has been repeatedly written, but the most interesting account of him was given by Camus in a work entitled *The Spirit of St François de Sales*.

SALISIAN NUNS, the nuns of the order of the Visitation of the Virgin Mary, so called from their founder François de Sales (see above), by whom and his friend Madame de Chantal this order was established in 1610, at Annecy, in Savoy, originally as a refuge for widows and sick females. In process of time, however, it was enlarged, and devoted principally to spiritual exercises and the healing of the sick. The nuns were clad in black, and in the eighteenth century there were 160 convents and 6600 nuns. There are still convents of the Salesian nuns in the principal cities of Italy, particularly in Venice and Trieste, and in Breslau. They now devote themselves to the healing of the sick and the education of young girls.

SALFORD, a municipal, parliamentary, and county borough of England, in Lancashire, which may be considered an integral portion of Manchester, though it has a mayor and corporation of its own, and a distinct parl constituency returning three members. Pop (1891), 190,139, (1901), 220,956. See MANCHESTER.

SALIANS, or **SALIAN FRANKS**, is the name given to that section of the Franks who from the third to the middle of the fourth century were settled on the left bank of the Lower Rhine, and whose conquests originated the Kingdom of the Franks.

SALIC LAW was the ancient code or system of jurisprudence of the Salians. It appears to have been committed to writing about the fifth century,

but according to Hallam it did not originate before the time of Clovis. The particular law, commonly called the Salic law, by which females were excluded from the throne of France, has been the subject of much dispute, and its modern application was probably fortuitous. The laws of the Salians do not appear to have usually excluded women from inheritance, and the particular law on which the exclusion rests did not originally refer to the crown, but to certain lands called Salic, and does not appear to have excluded women from the line of inheritance, but only from inheriting immediately. Its object may have been to secure the performance of military service. Various fanciful interpretations have been given of the term Salic in this law, but it is not really understood what it means. Its first application to the crown was probably that which barred the claim of Edward III. It remained in force from this time till the close of the French monarchy.

SALICYLIC ACID, a tasteless, inodorous, organic acid, well known as possessing great antiseptic and anti putrefactive properties. Its formula is $C_6H_4(OH)COOH$. It occurs in nature in the flowers of the meadow sweet, and also in an essential oil obtained from *Gaultheria procumbens* (winter-green). There are several processes for manufacturing salicylic acid on a large scale, and it forms an important article of commerce. It is largely employed in medicine, having properties similar to those of quinine, and is given in acute and chronic rheumatism, used as a lotion in irritation of the skin, &c. A salt prepared from it, salicylate of sodium, and some of its ethers, are prepared for internal use. Its use as a preservative of food or drink has been made a criminal offence by recent legislation in several European countries.

SALLI, priests of Mars, whose name is derived from *L salire*, to leap, to dance. Numa fixed their number at twelve, Tullus Hostilius added another twelve, who were called *Salli Collini*. Their origin is thus accounted for by the Romans. In the time of Numa Rome was desolated by a pestilence, which ceased when the gods let fall from heaven the *ancile* (a shield of a peculiar form). The soothsayers declared that this shield was the sign of the perpetuity of the Roman power, and advised that eleven others should be made similar to it, so that the true ancile could not be so easily purloined. This advice was followed, and all the *ancilia* were deposited in the *curia*. On the 1st of March every year when the *Salli* offered sacrifices to Mars they carried them about the city, clashing them together, executing warlike dances, and singing the *Salian* hymns—ancient songs in praise of Mars and the other gods, and of distinguished men, particularly of Mamurius, who made the eleven shields. The dress of the *Salli* was a purple tunic embroidered with gold, and bound with a brazen belt, and a toga with a purple border. On their head they wore a high cap in the form of a cone, with a sword by their side, a spear or rod in their right hand, and an ancile in their left. None but patrician youths whose parents were alive could be admitted among the *Salli*.

SALINATION, a term applied in chemistry to the union of an acid and base in such proportions as to produce a normal salt, thus if ammonia be added to nitric acid until the liquid no longer exhibits an alkaline nor an acid reaction, ammonium nitrate is produced, and the acid is said to be salinated.

SALINS (ancient *Salinae*), a town of France, department of the Jura, in a narrow gorge between two lofty hills, at the extremity of a fertile valley, 24 miles N.N.W. Lons-le-Saulnier. It owes its name to salt works, carried on in a vast edifice about 300 yards long, which stands in the midst of the valley,

Vol. XII.

is surrounded by walls, and derives its supplies from brine springs. There are brine-baths here which are well frequented, and Salins is also attractive to visitors from its interesting natural surroundings. The whole town, with exception of the establishment already mentioned and the hospital, was destroyed by fire in 1825, and was rebuilt chiefly by voluntary subscriptions obtained throughout the country. The chief manufacture is of salt. The Salins wine is also well known. The town ranks as a fortress of the fourth class. Pop (1896), 4492.

SALISBURY, or **NEW SARUM**, an ancient city, municipal and parliamentary borough of England, capital of the county of Wilts, 80 miles south west by west of London, in a pleasant and fertile valley, on the Upper Avon, where it is joined by the Wile, the Nadder, and the Bourne. It is built on a regular plan, with streets crossing each other at right angles, the houses being mostly of brick, arranged in rectangular groups surrounding yards and gardens. It is abundantly supplied with water from the Avon. Formerly many of the streets had streams of water running through them in open channels. At the head of its public buildings stands its magnificent cathedral, begun in 1220, and completed in 1258, one of the finest and most interesting specimens of Gothic architecture in the kingdom. It is in the form of a double cross, with a highly enriched tower and spire 404 feet in height, the highest in Britain, the interior is exquisitely beautiful, from the loftiness of its elevation and the delicacy and lightness of its structure. The material of which it is built is oolite freestone, the pillars and pilasters of the interior being of Purbeck shell marble. The total length of the building is 449 feet, the length of the longer transept is 204 feet, of the shorter, 143 feet, the width of the nave is 82 feet, of the larger transept 50 feet. There are many ancient monuments in the cathedral, and some ancient stained glass. A considerable amount of restoration has been effected on the cathedral in recent times. In the cathedral 'close, which occupies a large area, are the episcopal palace, deanery, and other buildings. There are three parish churches in the city, all fine edifices, &c. is also the Roman Catholic chapel, a structure of great beauty, by A. W. Pugin. In the centre of the city is the market place, a large open area, at the south-east corner of which stands the council house, a modern square building of white brick, with a handsome Doric portico. There are several ancient edifices in the city, interesting from their antiquity and architectural merits, such as St Nicholas Hospital, a picturesque early English pile recently restored, and the Poultry Cross, a hexagonal structure with six open arches, &c. The charitable institutions are numerous, as are also the educational. Salisbury was at one time celebrated for its woollen manufactures, but they are now extinct, subsequently it was famous for its manufacture of fine cutlery, but this has also dwindled away, and the city chiefly depends on its situation as a centre of distribution. Previous to 1885 Salisbury returned two members to Parliament, it now returns but one. Pop of parl borough, (1881), 14,792, (1891), 17,362, (1901), 19,421.

SALISBURY, EARL OF. See **CECIL**.

SALISBURY PLAIN, an elevated and undulating plain in Wiltshire, England, from which most of the hill chains of the middle and south of England proceed. It extends both north and south of Salisbury, but the name is most commonly applied to the portion between Salisbury and Devizes. It is about 20 miles in length (north to south) and 14 broad (east to west). Military manoeuvres on a large scale have latterly been carried out here. Upon the plain, about 8 miles north of Salisbury, is Stonehenge.

SALIVA, SALIVARY GLANDS The saliva, commonly termed the 'fluid of the mouth,' or 'spittle,' is that secretion whereby the food in the mouth is softened, reduced to a pulpy condition, and through the chemical action of which certain changes are effected in the constituents of the food. The saliva is elaborated and furnished by certain special glands known as salivary glands. In man these glands number three pairs, and they are also present throughout the Mammalian class generally in that number. Of these glands the first is that known as the parotid gland, lying one on each side, in front of the ear, before the mastoid process of the temporal bone, and behind the ramus of the lower jaw. The parotid gland rests upon the styloid process and neighbouring muscles. Its duct is named the parotid duct, or duct of Steno. It takes origin from above the middle portion of its front or anterior border, runs forward outside the masseter muscle, and turning inwards pierces the check and buccinator muscle, and finally opens into the mouth opposite the second upper premolar tooth. This gland measures from $2\frac{1}{2}$ to 3 inches in length, and it is nourished by branches from the main trunk of the external carotid artery, from the temporal, facial, and other blood vessels. Its nerves are derived from the facial, anterior auricular, and the external carotid plexus. The submaxillary glands, forming the second pair, rank next in point of size to the parotids. These glands are placed one on each side within the lower portion of the lower jaw, above the digastric muscle. The duct of each submaxillary gland runs forwards to open in close proximity to the duct of the opposite gland, beside the fold of skin (frenum lingue) which connects the tongue to the floor of the mouth. The ducts of the submaxillary glands are known as Wharton's ducts, and are each about 2 inches in length. The glands themselves are each about $1\frac{1}{2}$ inch, measured through their long diameter. The arteries and veins of the submaxillary ducts are derived from the facial and lingual vessels. The nerves come from the submaxillary ganglion, and from the facial and gustatory nerves. The sublingual glands form the third and last pair of distinct salivary glands in man. These latter glands are of smaller size than the parotids or submaxillaries, and are situated on the floor of the mouth, beneath the front part of the tongue and close to the frenum lingue. Each gland rests upon the mylohyoid muscle, and in shape somewhat resembles an almond. It varies from $1\frac{1}{2}$ to 2 inches in length, measured through its long axis. Its ducts are numerous, and open on the floor of the mouth by many minute apertures. The blood vessels of the sublingual ducts arise from the sublingual branch of the lingual arteries, and its nerves are derived from the gustatory branch of the fifth nerve.

In addition to these three pairs of definite salivary glands, other smaller (buccal) glands exist in the mouth, and are known under the names of labial, buccal, molar, palatine, and lingual glands. The excretory ducts of these subsidiary glands open simply on the mucous membrane of the mouth. Occasionally supplementary glands exist in connection with the sublingual glands, whilst an accessory parotid gland has also been described as related to the gland of that name. Regarding the minute or microscopic structure or histology of salivary glands, it may be noted that these structures present a structure termed *lobular*, in that they are composed of several distinct portions known as *lobes*. These lobes, which are united by areolar tissue, are in turn composed of smaller portions, termed *lobules*, and each lobule in turn furnishes of itself a complete representation of the structure of the entire gland. Thus every lobule contains a small branch of the main duct of the

gland, the subdivisions of which ultimately terminate in minute vesicles or sacs, known as *acini*. Each of these acini, which thus form the structural units of these glands, averages about $\frac{1}{15}$ th of an inch, and consists of a thin structureless membrane, lined on its internal surface by spheroidal or glandular epithelial cells. Externally to each of the acini a plexus or net-work of capillary blood-vessels exists, and this furnishes the common medium from which the salivary fluid is elaborated by the secreting or epithelial cells. The salivary fluid as found in the mouth is usually mixed with the mucus secreted by the mucous or lining membrane of the mouth, and is thus rendered of viscid consistence.

Salivary glands are absent in some Mammals (for example, Cetacea or Whales), in some Reptiles (for example, Crocodiles), and in most fishes. In Mammals alone salivary glands are present of the definite structure seen in man, but in many Reptiles, as in Serpents, definite (buccal) glands exist, within the inside margin of the jaws. In Birds the submaxillary glands may be of large size, and in some forms (for example, Woodpeckers) the saliva may be normally of a viscid consistence, adapted for smearing the tongue, and for thus aiding in the capture of the insect prey. Parotid glands may be wanting in some Mammals (for example, Ornithorhynchus and Echidna), whilst in the Ant-eaters the submaxillary glands acquire an immense development over the other glands, and form large structures which meet and unite on the chest, above the breast-bone. As in the Dog, a subsidiary gland of definite position, and known as the *zygomatic gland*, may exist, along with another supplementary structure known as the *accessory submaxillary gland*. The relation of the pancreas (which see) or sweet bread to the salivary glands would appear to be of definite kind, the secretion of the pancreas markedly resembling that of the salivary glands in chemical composition, and exerting an action on the food similar in many respects to that effected by the salivary secretion. In those forms, therefore, in which salivary glands may be wanting or undeveloped, the pancreatic secretion may supply the place of the salivary fluid. Among invertebrate animals salivary glands are usually well represented. Insects, and other Annulosa, and the generality of Molluscs, thus possess definite structures devoted to the secretion of the salivary fluid.

The chemical characters of the saliva afford an interesting study. When first secreted this fluid gives an alkaline reaction, and the secretion of the parotid glands is said to be more markedly alkaline than that of the other glands. During digestion this alkaline condition persists and according to Wright, the alkalinity of the saliva bears a direct relation or proportion to the acidity of the gastric juice of the stomach at the same period. During fasting the saliva gives a neutral reaction, and the same result is seen when it is slowly secreted, and when, in consequence, its alkalinity is neutralized by the acid of the mucus of the mouth. Externally viewed, and as obtained from the parotid ducts in a pure and unmixed condition, saliva is a watery colourless fluid, possessing a specific gravity ranging from 1.004 to 1.008. Microscopically examined, it is seen to contain minute solid particles, probably derived from the secreting structures, and when mixed with the fluids of the mouth the saliva may be seen to contain in addition epithelial scales from the mouth and tongue, and mucus corpuscles derived mostly from the tonsils (which see). If this mixed saliva is allowed to rest, these epithelial scales and corpuscles sink into the bottom of the containing vessel, and leave the saliva free above, as a fluid of

colourless nature, or which sometimes evinces a pale bluish gray tint.

The solids in saliva were estimated by Berzelius to amount to 1 per cent, and he gives the following as his analysis of this fluid —

Water,	992.9
Ptyalin,	2.9
Mucus,	1.4
Animal matter (extractives) and alkaline lactates,	.9
Chloride of sodium,	1.7
Soda,	.2
	1000.0

According to Tiedemann and Gmelin saliva consists of water, of fat containing phosphorus, of osmazone, chloride of potash, lactate of potash, and sulphocyanuret of potash, of animal matter soluble in alcohol, of matters soluble in water, and of substances soluble neither in water nor alcohol. Wright's analysis of saliva is as follows —

Water,	988.1
Ptyalin	1.8
Fatty acid,	.5
Chlorides of potash and soda	1.4
Albumen combined with soda,	.9
Phosphate of lime,	.6
Albuminate of soda,	.8
Lactates of soda and potash,	.7
Sulpho cyanide of potash,	.9
Soda,	.5
Mucus, with some ptyalin,	2.6

And Frerichs gives as the result of his analysis the composition of saliva as consisting of 994.10 parts of water, and of 5.90 parts of solids. The solids, according to Frerichs, consist of

Ptyalin	1.41
Fat	0.07
Epithelium and mucus,	2.18
Sulpho cyanide of potash,	
Phosphate of soda	} 2.29
" lime	
" magnesia,	
Chloride of soda	
" potash,	
	5.90

L'Heritier could detect no difference between the saliva of the two sexes, whilst he says that the saliva of children contains more water than that of adults.

The quantity of saliva secreted daily has been very variously estimated by different physiologists. About 12 oz in the twenty four hours has been stated as an average quantity, but the actual quantity secreted in the majority of cases during twenty-four hours far exceeds this amount. Mitscherlich was of opinion from his observations that from 16 to 20 oz might be estimated as the average quantity secreted during twenty four hours. Another and probably a nearer estimate is that of modern observations, which give from 2 to 3 pints as the amount secreted in twenty four hours. The rate at which this fluid is secreted varies greatly under different circumstances—such as during hunger or fasting, in health and in disease, in the young and in the old—and is probably a matter in which individual peculiarities of constitution and temperament count for much. During mastication the flow of saliva is greatly accelerated, the presence of food in the mouth acting as the stimulus to its secretion. The presence of food in the stomach—as has been ascertained when food was injected into the stomach through a wound in the pharynx, and without entering the mouth—appears to stimulate the salivary glands to secretion. And different kinds of food affect the secretion of saliva in different degrees, whilst mental impressions, without the presence of food, will cause saliva

to flow, or in familiar language will 'make the mouth water'.

The functions or uses of this fluid may be enumerated under the two heads of *mechanical* and *chemical* uses. The saliva acts mechanically in serving to incorporate and mix the food in the mouth, and to render swallowing more easily performed. It also assists in keeping the tongue and mouth moist, and in so rendering articulation easier. The swallowing of a moist morsel is well known to be of easier accomplishment than the deglutition of a dry bolus, and hence this latter action or office of the saliva may be esteemed one of its most important mechanical functions. The quantity secreted during mastication would appear to be regulated by the quality of the food, and M. Lassaigne has thus shown that, whilst in the mastication of 100 parts of bread crumbs thirty parts of saliva were sufficient to moisten the food, 120 parts were required to moisten 100 parts of crusts of bread, 42.5 parts for 100 of roast meat, and only 3.7 for 100 of apples.

The *chemical* functions of saliva become, of course, more intimately related to the phenomena of digestion than the merely mechanical aspects of its use. Its first great chemical function is that of converting the starchy matters of food, which are naturally insoluble, into soluble dextrine and grape sugar, which latter products are eminently digestible. Hence saliva may be regarded as the great agent whereby the important starch-products which form so large a proportion of the food of man are rendered fit for digestion and absorption. This action appears to be effected chiefly by the *ptyalin* contained in the saliva. In the stomach the conversion of starch into sugar compounds ceases, because the action takes place only in a neutral or slightly alkaline medium, and the action is thus arrested by the acid gastric juice. The ptyalin acts as a *ferment* in this function, and in a manner similar to diastase in the process of malting, being most active at the natural body temperature. Saliva has no definite action on sugar itself, on gum, or cellulose, and leaves fats unaffected, which, however, the pancreatic juice or sweet bread secretion specially alters and elaborates. Albuminous or gelatinous matters are not affected by contact with the saliva, and in this view it appears somewhat difficult to account for the action of the salivary fluid of animals such as the Carnivora, which subsist solely on animal matter, in which no starchy constituents reside. In such cases, however, the saliva may be of use in moistening the food for deglutition.

Calculous concretions (*salivary calculi*) may form in the salivary glands, and may cause obstruction of their ducts, and necessitate the performance of an operation for their removal. Saliva would appear to become abnormal and to constitute a source of infection in *hydrophobia* or *rabies*, whilst syphilis has also been alleged to have been transmitted through the medium of the salivary fluid. Occasionally the elements of urine have been present in saliva—forming the so called *urinary saliva* of pathologists—in consequence of diseased conditions, on the removal of which the secretion became restored to its normal composition. *Milky saliva*, so named from the presence of milk constituents, has also been described as a condition occurring in some parturient women.

SALIVATION, in medicine, a superabundant secretion of saliva, either determined locally by the use of masticating irritants, or by means which act upon the whole system, especially by mercurial preparations. In the last case it is accompanied by a coppery taste, and by the swelling of the gums, which become of a pale rose colour, except close to the

teeth, where they are of a deeper red. The breath is remarkably fetid, and the teeth seem elongated and loosened. If the use of mercury is continued the swelling of the gums increases, it affects the tongue and all the salivary organs, finally, the mucous membrane is studded with small superficial ulcers covered with a white skin. Salivation is ordinarily anticipated, during mercurial treatment, by maintaining cutaneous perspiration by means of warm baths, friction, and exercise. If salivation is persistent, notwithstanding the use of these means, emollient gargles containing more or less of opium are used, and on the abatement of the salivation they are replaced by astringent tonics. Several sulphur pastilles should be taken daily, and every three or four days a purgative. Foot baths or topical irritants applied to the lower extremities are also employed. Extract of belladonna administered internally in small doses is the best remedy for salivation.

SALLEE, **SALI**, or **SIA**, a seaport on the western coast of Morocco, on the Atlantic, 106 miles west of Fez, at the mouth of the Buregreb, formerly the great centre of Moorish piracy, immense depredations being committed from it upon European commerce. The river, which formerly admitted large vessels, is now choked up with sand. On the opposite side of the river stands Rabat, called often New Sallee. Rabat is becoming a place of considerable trade with Britain, France, and Spain, and is regularly visited by more than one line of steam vessels. Pop. of Sallee about 12,000.

SALLOW, a group of shrubs or small trees belonging to the Willow genus (*Salix*), distinguished by downy branches, with gray, stipuled, generally obovate leaves, toothed, wrinkled, and much veined on the under side. Among the species are *S. cinerea*, *S. aquatica*, *S. aurita*, *S. caprea*, and *S. acuminata*.

SALLOW THORN, or **SKA BUCKTHORN** (*Hippophae*), a genus of plants of the natural order Elaeagnaceae. *Hippophae rhamnoides*, a spiny shrub with silky leaves, delicious flowers, and small orange coloured berries, growing on sandy sea coasts, is the only species found wild in Great Britain or Europe. Its yellowish flowers appear in spring before the leaves, and the berries are formed in autumn on the female plants.

SALLUST, full name **CAIUS SALLUSTIUS CRISPUS**, one of the earlier Roman historians, was born B.C. 86 at Amiternum, in the country of the Sabines. He became quaestor about the age of twenty-seven, and tribune in B.C. 52. In B.C. 50 he was ejected from the senate either on political grounds, or, as is alleged, because he had committed adultery with the wife of Milo, and daughter of Sulla. In the civil war he was attached to the party of Caesar. In B.C. 47 he was praetor elect, and resumed the senatorial rank. He accompanied Caesar to the African war in B.C. 46. Caesar left him in Africa as governor of Numidia. He was accused of enriching himself by misadministration and oppression, which is probable, but all that is certainly known is that he did become very rich, and formed extensive gardens and a splendid residence on the Quirinal at Rome. After the death of Caesar he continued to live in retirement, and he died B.C. 34. His moral character, against which there are heavy charges, has been much discussed, but little is certainly known about it. The partisanship of the period may have had something to do with exaggerating the charges against him, even if it did not, as his advocates allege, originate them.

Sallust, probably in his later years, wrote several historical works. The *Bellum Catilinarium* is a history of the conspiracy of Catiline during the consulship of Cicero, B.C. 63. It appears to be written with impartiality. It contains speeches by Caesar

and Cato, but they are the composition of the author himself, though the real speeches appear to have been accessible to Sallust. The *Jugurtha*, or *Bellum Jugurthinum*, is a history of the war of the Romans against Jugurtha, king of Numidia, from B.C. 111 to B.C. 106. It is inaccurate and of little value. He is also said to have written a general Roman history from B.C. 78, or, according to others, B.C. 90, to B.C. 66, in five books. It is not extant, and although some fragments of the history of this epoch have been collected, it is doubtful whether a complete history of the period was ever written. Sallust is not painstaking or accurate as a historian. His style is concise and clear, and is not without merit, but it bears marks of effort, and his reflections are artificial and rhetorical. The first edition of Sallust was published at Rome in 1470. Among the best modern editions are those of Gerlach (Basel, 1823-31), Kritz (Leipzig, 1828-53), Dietrich (Leipzig, 1843-46), Jacobs (tenth edn., Berlin, 1894), Opitz (Leipzig, 1895), Merivale (1852), George Long (1881), and Capes (1884). There is an English translation by A. W. Pollard (1882), besides earlier ones. The Italian version of Alfieri rivals the original in conciseness.

SALLY. In the defence of a besieged place, if particular reasons do not determine to the contrary, frequent sallies are beneficial, in order to keep the enemy at a distance, to destroy the works, to bring in, if possible, the means of subsistence from the surrounding country, to afford an easy entrance to men or arms, or to favour the operations of a friendly force without. Sallies are undertaken to the most advantage after midnight, in cloudy or rainy weather, but they must be so managed as to surprise the enemy, and therefore must be carried on with great secrecy. The object of the sally determines the number of soldiers, they are frequently accompanied by artillery and cavalry, they must in no case separate themselves too far from the fortifications, to avoid being cut off, and on their return must neither obstruct the defence nor occasion any confusion which may favour the attack of the enemy. By sallies with a small number of troops the besieged often endeavour to entice the besiegers within the fire of the fortress, or to harass and exhaust them. A commander of a fortress will make use of sallies as long as he is able, as the best means of defence. — *Sally port*, a postern, or a passage underground from the inner to the outer works, to afford free egress to troops in making a sally, closed by massive gates when not in use.

SALMASIUS, **CLAUDIUS** (the Latinized name of Claude de Saumaise), distinguished for his learning, was born at Semur, in Auxois (now the department of Côte d'Or), in 1588. His father, a respectable magistrate and a learned man, instructed him in the ancient languages, in which he was highly proficient while a mere boy, and then sent him to Paris to study philosophy. His edition of Florus, which was published in 1609, and, according to his own assertion, had already been completed several years, is a remarkable proof of his early erudition. In 1606 he went to Heidelberg to study law under the celebrated Gothofredus (Godefroy). The excellent university library there gave him an opportunity to gratify his literary curiosity and to extend his reputation by the publication of his learned labours. On his return to France in 1610 he began to practise his profession, but soon withdrew from it to devote his whole time to study, and the rest of his life was occupied with critical labours and learned controversies. His mother, a Calvinist, had educated him in Protestant principles, and in 1623 he married the daughter of a respectable Protestant. Several years later he passed some time at the country seat of his

father-in-law, near Paris, where he completed his great labour on *Pliny and Solinus*. In 1629 his father was desirous of transferring to him his place, and the parliament of Dijon made no objection, although he openly professed Calvinism, but the keeper of the seals, Marillac, refused to sanction the step. The invitations of the Universities of Padua and Bologna were declined by Salmasius, but in 1651 he accepted the offer of the professorship which had been held by Joseph Scaliger at the University of Leyden. His friends made several attempts to induce him to return to France, and Cardinal Richelieu offered him a pension on condition of his writing a history of his ministry, but Salmasius declined all these offers. In 1649 Charles II of England induced him to write a defence of his father (*Defensio regni pro Carolo I*), which was answered by Milton's *Defensio pro Populo Anglicano* (See MILTON). The zeal with which Salmasius defended royalty in this work offended his republican patrons in Holland, and he therefore the more readily accepted the invitation of Queen Christina to visit Sweden (1650). But the climate of Sweden was so unfavourable to his health that he returned to Holland the next year, and died in 1653 at Spa, whither he had gone for his health. Although virulent in controversy, Salmasius was remarkably gentle and kind in private, and at home was entirely governed by his wife. The most important of his numerous works are his *Pliniana Exercitationes in Solinum*, his edition of the *Scriptores Historiæ Augustæ*, *De Mutuo*, *De Modo Usurarium*, *De Foenore Trapezitico*, *De Re militari Romanorum*, *De Re Hellenistica*, *Observationes in Jus Atticum et Romanum*, &c. All his works display erudition, but are less remarkable for taste or judgment. His learning was aided by a powerful memory. Besides the classical and many modern languages, he was acquainted with Hebrew, Chaldaic, Arabic, Persian, Coptic, &c.

SALMON, a Teleostean fish, forming the type of the family Salmonidæ (which see), which group is in turn included in the sub order Malacopteri or Physostomata, the members of which are primarily distinguished by possessing 'soft' or many jointed fin rays, with the occasional exception of the first rays in the dorsal and pectoral fins. A swimming bladder is invariably present in this sub order, and communicates with the throat by a *ductus pneumaticus*, or homologue of the windpipe in higher forms. The Salmon family is further included in that section of the Malacopteri known as the *Abdominalia*, distinguished, as implied by this term, by its members having the ventral fins placed far back on the body, or in other words, abdominal in position. The members of the typical genus *Salmo*, of which the Salmon itself (*Salmo Salar*) is the typical species, are distinguished by the smoothness of the head. Teeth are borne on the vomer, on the palatine and maxillary bones. The branchiostegal rays are frequently unequal on the two sides. The species of this genus inhabit both salt and fresh waters, and the second dorsal fin is of a soft or adipose consistence, and without rays.

The Salmon is not only the typical representative of its family, but also ranks foremost among the food-fishes of Britain and of other countries. It is protected by special legislative acts, and its reproductive habits and development have been made the subjects of special study by economic ichthyologists. Certain questions connected with its development have not yet been definitely settled to the satisfaction of *savants*, and whether viewed from a scientific or from a purely economical stand-point, this fish at once assumes a place in man's consideration far exceeding in importance that of any other fish, as well as of

many animals of higher rank in the created scale. The salmon generally attains a length of from 3 to 4 feet, and an average weight of from 12 to 20 or 30 lbs. It is almost needless, however, to remark that these limits both of size and weight are frequently exceeded. Some specimens have weighed 60 lbs., and it is no uncommon event to find salmon of 45 or 50 lbs weight, whilst Yarrell mentions one female fish which was captured in 1821, and weighed 83 lbs., as exposed in a fishmonger's shop in London. The colours vary greatly throughout life, and at different periods of the same season. The typical colour of the adult fish is a blackish blue on the back and upper part of the head, the belly being of a glittering silvery white lustre, and the sides blending above and beneath with the dark and light hues respectively. On the body generally, but especially near the 'lateral line' or side mark, a few black spots are observable. The male during the breeding season displays unusual brilliance of coloration, the cheeks being coloured with streaks of bright orange colour, and a rich golden tint spreading over the body.

In habits the salmon is a voracious fish, possessing teeth on the upper jaw, palate, and vomer or roof of the mouth. The lower jaw also possesses teeth, and the edges of the tongue are similarly notched or toothed. The vomerine teeth fall out or are absorbed in the adult fish, and are hence characteristic chiefly of the young state. The food consists of animal matter, and must vary in accordance with the change of habitat which the salmon exhibits in passing periodically from fresh to salt water, and *vice versa*. In some cases the remains of Sea urchins or Echini have been plentifully found in the stomachs of these fishes, whilst there can be little doubt of the large proportion of Crustacean life which the Salmon absorbs as food. This last remark holds especially true of the salmon in its fresh water habitat, since the multitudinous swarms of lower Crustacea found in all rivers form an abundant source of nutritive supply ready at hand. These fishes are caught by the rod, and by means of nets. The highest flight of the piscatorial art may be typified in the successful fishing of salmon with the rod and line, these fishes, through their large size and great strength, leading the angler frequently for long distances from the original point of capture, and causing him to exert all his dexterity to save his tackle and to successfully land the wary prey. The bait or fly most frequently used is generally some gaudy glittering object denominated a 'salmon fly,' these fishes, like mackerel and other species, being apparently attracted by the lustre and glitter of the bait, rather than by a desire for food. For purposes of commercial supply salmon are taken in nets of special construction and of various forms, the fishings being regulated by law not only as to their seasons and times, but also as to the form and disposition of the machines for the capture of the fishes. In former days the practice known as 'burning the water' used to be resorted to in the Tweed for the capture of salmon. This practice consisted in burning torches, and of so luring the fishes towards the glare, when they were speared with the 'leister'—a sharp fork—or taken by other means. 'Stake nets' supported on piles of wood, and extending out into the sea, and 'bag' or 'drift nets,' are the means most frequently employed in the salmon fishery. Formerly these nets did much harm to the reproductive interests and multiplication of these fishes by intercepting them on their way to spawn, and in this way limiting the increase by destroying the fertile females. On this subject Mr Bertram in his *Harvest of the Sea* says, 'These machines' (namely

stake and bag nets) 'exercised a baneful influence on the fisheries, and in numerous instances intercepted about one half of the salmon of particular rivers before they could reach their own waters. These nets are erected in the tide ways, not far from the shore, and as the fish are coasting along towards their own particular spawning ground they are intercepted either in the chambers of the bag-net, or in the meshes of the stake net' By wiser legislation, however, the salmon fisheries have been, and only just in time, placed on grounds more commensurate with the reproductive welfare of these fishes. And if the schemes for the purification of rivers could only be carried out in their entirety, and manufacturers be wholly prohibited from sending their refuse-material into the rivers of our country, we might restore the salmon to the place, in point of plentifulness and numbers, that it formerly occupied among the food fishes of this land. As it is we must be thankful for the legislation that prevails, and regarding the times to which the fishing of salmon is restricted, it may be mentioned in passing, that on the Tweed the river is closed for salmon-fishing from October 15th to February 15th, while north of the Tweed the fisheries are closed from September 14th to February 1st.

The development of the salmon, its breeding seasons, and its migrations to and from the sea form the chief points to which the attention of naturalists and economists has been directed, with the view of legislating for its welfare in accordance with the natural laws regulating its life and existence. The spawn is deposited in rivers, in October, November, and December, and lies inactive until the succeeding April or May, when the dormant vitality of the egg is exchanged for the more visible progress of active development. Above 100 days are thus required for the development of the young fishes from the eggs, which are deposited in a shallow trough or groove excavated in the gravelly bed of the river by the stout under jaw of the male, which appears to be specially developed at the breeding season. Some observers say that both sexes participate in the work of excavating this furrow, but be that as it may, the eggs are herein deposited and fertilized, the process occupying on an average about ten days. The salmon thus quits the sea at autumn, and ascends rivers for the purpose of spawning. The ascent may be apparently a matter of much difficulty, but all obstacles are overcome by the agility of these fishes, which by their immense leaps at the salmon 'weirs' or cataraacts are enabled to successfully mount towards the upper sources of the river. In most of the 'weirs' an ingenious arrangement of stages or steps is constructed so as to aid the fishes in their ascent of the river steep. Having spawned these fishes remain during the winter months in the rivers, and begin to return to the sea with the floods which herald the returning spring time. It has been noted that the salmon remain in the brackish water at the estuaries or mouths of these rivers for some days both in returning to the sea and before ascending the rivers, this habit apparently having for its object their more gradual intiation into the salt water or fresh water, as the case may be, and the avoidance of a sudden change of habitat. During this interval also the marine parasites infesting these fishes, in the case of the migration from the sea to the rivers, are killed by immersion in the fresh water, whilst the fresh water parasites which attach themselves to the salmon during their river sojourn are in like manner killed by the succeeding migration from the river to the sea.

It has been alleged that salmon invariably return to the rivers in which they were spawned, and although the statement must be received with some reservation

it is nevertheless borne out or rendered feasible by the investigation of certain cases of migration. The influence of habit may be as powerful in this instance as in any other, and the statement may be accepted therefore as expressive of a general truth, without tying one to its universal or special applications. In their fresh water sojourn the salmon become lean, and fall off in condition, and it has been asserted that their stomachs at this period contain no food. This is probably an erroneous view, and besides being unlikely from *a priori* and reasonable suppositions, we might argue that feeding, as these forms do, on minute Entomostraca, and other lower Crustaceans, their fresh-water food is of such a kind that it would be hardly, if at all, perceptible, on a rough examination of their stomachs.

Quickening into active developmental life in the April or May succeeding the deposition of the salmon ova the young fry are duly born. The eggs deposited early in the autumn, when the temperature is high, develop at an earlier date than those deposited later on. A difference of fifty days has thus been observed between the birth of fry from eggs deposited in September and those deposited in December of the same year, the September ova ripening in ninety and the December ones in 140 days. Eggs have been ripened at Hunningue in sixty days, and in Stormonthfield ponds (see PISCICULTURE) in 120 days, the usual time for hatching required in the Scotch rivers being about 130 days, or between four and five months. For about a month after its birth the young salmon is nourished by means of the umbilical vesicle or bag, and averages about $\frac{1}{4}$ inch in length. In about fifty days it has assumed the likeness of the parent fish, and the yolk bag has disappeared. The young salmon is weak and timid at this period, and hovers about its birth place, finding a shelter under the stones that fringe the borders and the least disturbed and least actively running parts of the stream. It now approaches the first definite or *parr* stage of its existence, and begins to be marked by transverse bars of dark colour. At the age of two years or a little more the parr condition is exchanged for that of *smolts*, and the young fishes are then supposed to leave the river and to make their first migration to salt water. It has been noted that, of an entire hatching, about one half of the fry may come to maturity as parr in about twelve months after birth, the other half delaying their change until the expiry of the two years, as above described. Such an anomaly presents us with the feature of some members of a brood being simply small parr, whilst at the same period other members may be grise, and may thus weigh 4 lbs. Each succeeding migration to and from the sea will of course increase the weight of these forward members of the brood. No explanation has as yet been offered of these facts, which, as here stated, have been duly proved beyond possibility of a doubt. The smolt, it may be observed, differs from the parr in possessing a covering of bright silvery scales instead of the banded markings of the parr, although these latter markings may be seen to exist beneath the brighter scales. The belly in the parr is of a diaphanous blue colour, and whilst in the parr condition the young salmon are unable to live in salt water. The smolt betaking itself thus to the sea for the first time grows rapidly on the more liberal dietary afforded by the ocean, and reappears to its native river in a wonderfully altered aspect. Leaving its native river as a fish averaging about 6 or 8 inches in length the smolt may return in about two months to fresh water in the form of a *grise* weighing from 3 to 4 lbs., or after a sea life of six months it may attain as a *grise* a weight of 10 or 12 lbs.

In the *grise* stage, or *salmon peel*, as it is sometimes

termed, the fish is capable of depositing eggs. After this labour, performed as before in the rivers to which it ascends, the grilse again seeks the sea. And after its second stay in the ocean it returns after a two months' absence as the adult salmon, weighing from 10 to 12 lbs. To test the increase of weight in the grilse and salmon states the late Duke of Athole caused a salmon caught on 1st March, 1825, in the Tay 40 miles distant from the sea, to be marked just after it had spawned or become a 'kelt,' as such fishes are termed. It then weighed 10 lbs. This same fish was again caught five weeks and two days afterwards, when it had been to the ocean, and it was found that it weighed no less than 21½ lbs. 'Kelts,' or salmon which have spawned, are in bad condition, the flesh being white and ill smelling, but notwithstanding these properties, and the existence of laws forbidding the capture of kelts, quantities of these fishes are caught by poachers in many rivers, being then often cured by drying, or, as it is called, 'kippering.'

A hot controversy has from time to time raged respecting the identity of parr and smolts with the young of salmon, and the question cannot even now be regarded as being definitely or absolutely settled either way. As the male parr possesses fully developed 'milt' or soft roe it has been argued that this full development of the reproductive system betokens an adult form and not an immature stage. The female parr, however, does not possess a similar development of the ovaries or spawn, and besides, the male salmon in a very young state, weighing only about 1½ oz., may have fully developed milt, and be capable of fertilizing the eggs of the adult female. Extraordinary precocity in sexual development on the part of the developing males is, in short, no argument against the nature and relations of these males as compared with the adult salmon. The question, 'Are parr the young of the salmon?' may be answered, if it is to be answered at all, most safely and reasonably, in the affirmative. It has been similarly asserted that grilse are not the young salmon, the objection to considering the grilse in this light chiefly arising from the fact of its exceedingly rapid growth—an objection which experiments conducted after the fashion of the late Duke of Athole's observations, already detailed, would seem to finally dispose of. Grilse are unfortunately frequently killed during their return journey to the rivers or before that return, when they are ready to spawn, this slaughter depriving us of the means whereby a vast increase in the numbers of salmon might take place.

The fertility of the salmon is very great. It has been calculated that over 150,000,000 of salmon ova are annually deposited in the Tay alone, and of these only about a third, or 50,000,000, come to life and attain the parr stage, whilst of these parrs only 20,000,000 become smolts, and in time only 100,000 remain as perfect salmon, of which 70,000 are caught and 30,000 left for breeding purposes. If a salmon produces 17,000 ova, only 800 of these, according to Sir Humphry Davy, will come to maturity. Each female yields about 1000 eggs for every pound of her weight, on a rough estimate, and vast numbers of eggs fall a prey to the voracious trout and to other fishes as well as to the salmon themselves.

The chief British salmon fisheries are those of the Tweed, Tay, North Esk, Spey, Severn, and some of the Irish rivers, there are important fisheries in the rivers of Norway, the Rhine, and other European waters, whilst on the American coasts fisheries of salmon have also been established. The Tay fisheries yield a gross annual revenue of about £17,000. The Speymouth fishings on the Spey are worth about £12,000 per annum. The price of early salmon per

pound averages from 2s or 2s 6d., whilst later on, it sinks to 1s or 1s 3d.

The flesh of the salmon when fresh is of a bright orange colour, and, as already remarked, is of highest flavour when taken from the sea feeding. It must be eaten in the fresh state to insure its delicacy, and the salmon of the New World are largely imported in the form of preserved provisions into this country in a fresh state and at a very moderate price.

A few sentences may be devoted to the allies of the Salmon. The Salmon Trout (*Salmo trutta*) is a British species of Salmonidae, which, like the Salmon, migrates alternately to the rivers and sea. Another species of Salmon (*S. Rosu*) is found in the Arctic Sea, and chiefly on the American coasts, at the estuaries of rivers. In form this fish is more slender than the Common Salmon, and its under jaw is elongated and projecting, whilst the scales are of small size and detached from each other. The sides are marked with crimson spots. The Common Trout (*S. fario*), found in most of the lakes and rivers of Europe, is an allied species to the Salmon. It is of a yellowish brown colour on the upper parts, and is speckled with dark red and carmine spots along the sides and lateral line. Various varieties of Trout (for example, Lochleven Trout) occur in different waters. The Bull or Gray Trout (*S. eriox*) is another familiar member of the Salmonidae, and is found in the Tweed and other rivers. See also TROUT. See the figure at ICHTHYOLOGY, Pl. III.

In a fossil state the Salmonidae first appear in any quantity in the Post Tertiary deposits, although remains of these forms occur sparsely in formations of older age. The genus *Osmorhiza*, regarded by some authorities as belonging to the Salmonidae, occurs first in the Cretaceous rocks. See also ICHTHYOLOGY, PISCICULTURE, &c.

SALMON FISHLING, LAW OF. See POACHING.

SALMONIDÆ, a family of Teleostean fishes, belonging to the subdivision Malacopteri of that order. To this family belong the various species of the well known salmon genus (*Salmo*, see SALMON), the Trout (*S. fario*), the Char (*S. salvelinus*), the Grayling (*Thymallus vulgaris*), the Smolt (*Osmorus eperlanus*), &c. The Salmonidae are abdominal Malacopteri, in that their ventral fins are placed backwards on the belly. The fin rays are soft, as in all malacopterous fishes, with the occasional exception of the first ray in the dorsal fin. In the Salmonidae a second dorsal fin of a soft or adipose nature is present, this appendage possessing no rays. The maxillary bone assists in forming the biting edge of the upper jaw. An air-bladder is invariably present. The scales are of the cycloid character, and the pyloric extremity of the stomach is provided with numerous caecal or pocket like appendages. The ovaries are somewhat peculiar in disposition in the Salmonidae, in that they are closed sacs unprovided with oviducts or efferent canals. The ova accordingly escape from the ovary simply into the cavity of the abdomen, and pass outwards through a small opening or 'pore' placed near to the anus or vent. Allied to the Salmonidae, and included in that family itself by some authors, are two small groups or genera—the *Stiopelidae* and *Serrasalmodae*, the members of the former group occur in the Mediterranean and tropical seas, the latter group being represented in the rivers of South America.

SALONICA (ancient, *Thessalonica*, Turkish, *Saloniki*), a large seaport city of Turkey in Europe, on a gulf of the same name, 315 miles w s w of Constantinople. It has a magnificent appearance from the sea, being placed on the acclivity of a steep hill, which rises from the north eastern extremity of the gulf. It is surrounded by lofty stone walls about 5 miles in circuit,

which ascend from the sea in a triangular form, and is surmounted by a fortress with seven towers. Domes and minarets are numerous, and, being environed as usual by cypresses, add to the imposing appearance of the city. By means of aqueducts water is brought from the hills for the supply of the city. The bazaars are extensive and well supplied. The town is rich in Byzantine churches that have been converted into mosques. The mosque of St Sophia is a beautiful structure, similar to but on a smaller scale than that at Constantinople. This fine building was seriously damaged by fire in 1890, the city having suffered severely from a great conflagration on this occasion. The church or mosque of St George is a circular building 79 feet in diameter internally with walls 20 feet thick, ornamented by early Christian mosaics dating from about 400 A.D. That of St. Demetrius is another noble building, with a specially fine interior divided into a nave and double side aisles. There are other large mosques, besides Greek churches and Jewish synagogues. Among the antiquities of the city is the triumphal arch of Constantine (now much dilapidated). The trade of the place is very considerable, and has increased since the construction of the railway connecting it with the Servian and other railways of Eastern Europe. A line is also being constructed to Monastir in Macedonia, and is expected to open up a rich tract of country. The principal exports consist of corn, cotton, tobacco, silk cocoons, opium, wine and brandy, skins, antimony, timber, and wool, the imports of cotton, sugar, coffee, flour, coals, iron and iron goods, petroleum, salt, rice, glass, &c. Great Britain has a greater share of the trade than any other country, the others next in importance being Italy, France, Austria, Hungary, and Turkey. The value of exports in 1900 was £1,220,575, of imports, £2,553,451. The vessels at Salonica lie at anchor before the town. Pop. nearly 120,000, of whom a large number are Jews and Greeks. The town has an interesting history. The gulf of Salonica (anciently, *Thermus Sinus*) is a large arm of the Aegean Sea, between the peninsula of Chalcidice and the coast of Thessaly. It is about 85 miles long from south-east to north-west, with an average breadth of about 35 miles.

SALOP, COUNTY OF. See SHROPSHIRE.

SALPA, a genus of free swimming Ascidians or Tunicata, forming the representative example of the family Salpidae. These animals are unlike the commoner members of the 'Sea squirt' or Ascidian class in that they are free and oceanic in habits, being found floating in tropical seas, and they further present a peculiarity in their organization, in that they are met with in two distinct forms, in one state being single or solitary organisms, and in the other state forming aggregated or compound collections, the so called 'Salpa chains'. To the phenomena, in virtue of which this alternation of the solitary with the compound Salpae takes place, Chamisso gave the name of 'alternation of generations'. The Solitary Salpa thus produces (by a process of budding or gemmation), from a process termed the *stolon*, a long chain of aggregated embryos, which become the Salpa chain. The individuals of this compound chain have the power of producing, by means of true eggs and by a process of true sexual reproduction, new individuals, the latter, however, being invariably solitary Salpae. Thus, to use the familiar illustration of Chamisso, the Salpa progeny never resembles its parent, but always appears in the likeness of its grand parent. The compound forms thus produce single Salpae, whilst the single forms in their turn give birth to compound chains, each generation 'alternating,' as it were, with the next. The entire process, however, is not so much one of an alternation of

generations as of a process of budding (seen in the solitary forms), alternating with true reproduction by means of eggs (seen in the Chain Salpae). The Solitary Salpa has no power of increasing save by budding, and the individuals of the Chain Salpa have, on the other hand, no power of reproduction save by means of ova or eggs.

Each single Salpa exhibits the essential structure which is found throughout the class of Tunicata (See MOLLUSCA). Each Salpa is of oval or quadrate form, the body presenting an aperture at either extremity. Locomotion appears to be effected by the expulsion of water from the anterior aperture, and the Salpa chains thus swim freely and swiftly over the surface of the ocean. The organs of the body occupy a comparatively small space within the body cavity. *Salpa maxima* is the most familiar species, and the Chain Salpae are met with very frequently in the Mediterranean Sea. They also occur, but more rarely, off the British coasts, and exhibit the phenomenon known by the name of phosphorescence (which see) or animal luminosity.

SALSIFY (*Tragopogon porrifolius*) belongs to the natural order Compositae, and is allied to the endive and dandelion. The root is long, white, tapering, and fleshy, the stems 2 or 3 feet high, striated, hollow, and branching, the leaves are alternate, embracing the stem, narrow, and long, the flowers are solitary and terminal, the involucre or common calyx consists of several lanceolate leaflets, much longer than the corollas, the corollas are violet purple. It grows wild in the south of Europe. The roots form a light and wholesome aliment. Many prefer the root of the *Scorzonera Hispanica*, a plant somewhat resembling the salsify, but with yellow flowers. The root of this last is carrot shaped, about as thick as one's finger.

SALSETTE, an island off the western coast of Hindustan, and so near that on which the town of Bombay stands that it has since 1805 been connected with it by a causeway, length, north to south, 18 miles, medium breadth, about 11 miles. The surface is well diversified, presenting an alternation of rocky hills, covered to their tops with underwood, and valleys, partly fertile and well cultivated, particularly in the south, but more frequently covered with groves of mangoes, palms, and various timber trees. Among the jungle the tara palm and cocoa nut grow spontaneously. The principal crops are rice, indigo, cotton, flax, and hemp. Game is very abundant. Great numbers of monkeys frequent the jungle. Much grass is sent to Bombay. The early colonization and prosperity of the island are indicated by a number of remarkable antiquities, among which are a great number of caverns artificially excavated in the rocks. One of these is a Buddhist temple, with two gigantic figures of Buddha, about 20 feet high, one on each side of the vestibule. The Portuguese, who long possessed the island, and converted great numbers of the native Hindus, transformed the temple into a Christian church. They were dispossessed about 1750 by the Maharrattas, who in their turn were driven out by the British in 1773. It is traversed by two lines of railway. The population in 1881 was 108,149.

SALT, in chemistry. To write the history of the word salt would be almost equivalent to writing the history of chemical science, for as the science has developed so has the meaning given to this word been altered. In the early days of chemistry salt seems to have meant the solid substance obtained by evaporating sea water, and this meaning is in keeping with the use of the word *hals* in Greek, this word in the feminine being used to designate the sea, and in the masculine the substance ob-

tained from sea-water by evaporation. From the easy solubility of the body to which the name of 'salt' was originally applied, the idea of solubility in general was derived, and all substances possessed in a somewhat marked degree of this property were termed salts. But common salt was possessed of another well marked property besides that just mentioned, it had a characteristic taste, and so the property of affecting the sense of taste was gradually added to that of solubility as a distinguishing feature of those substances to which the name of 'salt' was given. The principles which guided the application of the name 'salt' were thus founded more upon the properties than upon the formation of the substances so named. In the year 1744 a French chemist, Ronelle, adopted as the basis of a general theory of salts the relations which existed between the different classes of substances called acids and alkalis and those substances produced by the union of these. These relations had been partially recognized before Ronelle's time, but by him they were brought into prominence. Lavoisier developed these views, and as his school regarded all acids as oxidized compounds, and as all bases were also known to contain oxygen, a salt came to be regarded as a substance produced by the union of an electro-negative oxide (an acid) with an electro-positive oxide (a base). But the researches of Sir Humphry Davy rendered it very probable that common salt—the type of all these other so-called salts—was a compound of two elementary substances, sodium and chlorine, and that it contained no oxygen. Hitherto the name salt must be denied to this substance—the original prototype, or it must be viewed as containing oxygen. The latter view was generally adopted by the holders of the Lavoisierian theory. Chlorine was, by this school, looked on as a compound substance, into the constitution of which oxygen entered. The discovery by Faraday of three chlorides of carbon led Berzelius, the great leader of the school which doubted the existence of non-oxygenated salts, to change his views, and to admit that true salts might exist which contained no oxygen, and that common salt, sodium chloride, was one of those. Thus the way was cleared for the recognition in the family of salts of many members which had long been excluded therefrom.

It is difficult to define the meaning of the term salt as it is used by modern chemists. In its widest sense all chemical substances, even the elements, may be classed as salts, the leading idea seems to be that a salt shall be a body which is very readily capable of undergoing double decomposition—that is, a body which, when brought into contact with another, exchanges some of its elementary constituents for those of the other body. Such exchanges take place most readily between substances when in solution, but inasmuch as the products of such exchanges are often themselves insoluble, the name of salt is extended to those insoluble substances which are produced by the double decomposition of soluble bodies. As acids are defined to be bodies containing hydrogen, a definite amount of which is replaceable by metals when the bodies are brought into contact with metals, metallic oxides, or hydroxides, so salts may perhaps be defined, or at any rate described, as bodies formed by the replacement of the hydrogen of acids by metals or by atomic groups acting as metals.

SALT, COMMON, is chemically the chloride of sodium (see SODA). It is very abundant in nature. It is also in very great demand for human consumption, and it has, on the ground of its universal consumption, been a favourite object of taxation and monopoly by governments. These circumstances determine the leading conditions of the commerce in salt. Its diffusion makes it almost everywhere a natural

object of home production, and its exportation would be comparatively rare were there not great differences in the mercantile habits and development of different peoples. A more advanced industrial economy on the one side may make one country an exporting and another an importing one, but besides the general development of industry there are accidental circumstances which always more or less influence the development of particular trades, so that this cannot of itself be taken as an accurate test of the industrial condition of any country. Taxation and monopoly also interfere in many cases to prevent the growth of the trade. The consumption of salt varies much in different countries. According to Mithall it was in Britain in 1891, 62 lbs per annum for each individual, in France, 36 lbs, in Austria, 18 lbs, in India, 12 lbs, and in the United States, 48 lbs.

The great source of supply of salt is the ocean, but others are very abundant. The ocean has itself doubtless derived its supply of salt from the salines deposited in the earth, either directly or through its numerous streams and tributaries. The same cause is still in operation to increase the saltiness of the sea, which, as it loses bulk by evaporation, deposits the redundant salt which it slowly accumulates on its own beds. To this cause is also due the formation of salt lakes. Salt springs, produced by water passing over saline deposits, are another abundant source of supply, and the remaining source is the deposits themselves, which are widely diffused, sometimes on the surface, sometimes at greater or less depths, being found in almost every geological series.

Rock salt is found in great abundance in Cheshire and Worcestershire, where also salt-springs furnish a large supply. The whole of the Permian group in Russia is impregnated with salt, and the extensive salt lakes in the government of Astrakhan are supplied by streams passing over salt plains, or springs passing through salt deposits in that and neighbouring provinces. The Crimea is also richly stored with salt, which impregnates the soil. From Galicia on both sides of the Carpathians a salt region extends through Hungary and Transylvania into Wallachia and Moldavia. Most of the provinces of Prussia are well supplied with salt, and Venice has extensive salt lagoons. In Catalonia there is one of the most remarkable of salt mines. It consists of a hill 328 feet high, and embracing an area of three fourths of a square mile, four fifths of which consists of salt, its other constituents being clay and gypsum. The finest quality of salt is found here in considerable masses quite pure. The supply in the other continents is equally abundant. The plains of Siberia and Tartary are covered with salt incrustations. The basin of the Indus and other parts of India also possess extensive salt plains. In China salt-wells of great depth abound. The Desert of Sahara and the salt water lakes of Central and Southern Africa afford inexhaustible supplies. The salt lakes of the American Pampas extend from St Julian in Patagonia to Chaco in the Argentine Republic. These lakes, which are very shallow, dry up altogether during the hot season, leaving the salt deposited in great cubes of a snow white appearance over the plains. Patagonian salt, which is very pure, forms a considerable article of export. Chili, Peru, Colombia, Venezuela, and the West India Islands have also extensive supplies. British Guiana exports salt, and nearly all the states of the American Union have large natural supplies.

The finest salt is manufactured from sea water, and is produced along the Atlantic and Mediterranean seaboard of Europe. France, Spain, and Portugal are the chief producing countries. It is made chiefly by natural drying in shallow reservoirs, or by boil-

ing From the slowness of the evaporation, sun-dried salt is the purest In the government of Archangel a strong brine is first made by freezing out the fresh water, the process of extraction is then completed by boiling The greater part of the Mediterranean coast is more favourable for drying, and the most important French manufactures are in the lagoons and islets of the Mediterranean A considerable quantity of salt used to be sent from France to England, but Britain now produces far more salt than she requires Salt was formerly an extensive product in the lagoons of Venice, and the trade, which had declined, was revived on a large scale by Napoleon I The salt mines of Wieliczka in Galicia were worked as early as the twelfth century, and formed an important source of revenue to the Polish kings Austria exports salt largely, and Prussia, though with ample natural supplies, imports it Russia with its vast supplies has always been an importing country, yet there are extensive salt works on Lake Elton in the government of Astrakhan, in the governments of Perm and Vologda, and in the Crimea

England has long been an important salt producing country The chief seats of the manufacture are the counties of Cheshire and Worcestershire In the former, which yields the great bulk of the production, the district in which the chief supply is found is the basin of the Weaver, the central points being Winsford and Northwich Here the supply seems inexhaustible It is derived both from springs and mines At Northwich the deposit extends to a breadth of three fourths of a mile, under gypsiferous clays and marls of a depth of 120 feet to a depth of 60 to 90 feet, and after a bed of 30 to 40 feet of indurated clay there is a lower bed of rock salt to a depth of 100 feet Salt springs which are pumped up from the lower bed, are at present the chief source of supply The rock salt is purified by dissolving it in sea water and evaporating in shallow pans by natural or artificial heat Weak brines are strengthened by raising them into elevated reservoirs, and causing them to trickle down over long layers of brushwood on an inclined plain exposed to the sun and wind Salt was formerly made in Scotland from sea water, but since the removal of the duty the manufacture has been nearly abandoned Ireland still produces small quantities of salt In British India the manufacture of salt has greatly declined since the admission of British salt In 1901 the export of salt from Great Britain amounted to a total of 617,203 tons, the value being £509,110 India and the United States are the largest consumers of British salt It is estimated that in Britain upwards of 1,000,000 tons are used for home consumption, the total production being about 2,000,000 tons per annum The total quantity of salt produced in the United States in 1900 was estimated at about 2,608,668 tons The chief salt producing states are Michigan (with about half of the total production) New York, Virginia, West Virginia, and Ohio Salt is used as a glaze for coarse pottery, for giving hardness to soaps, and for improving the clearness of glass It is also the source of soda and chlorine, and is thus of immense industrial importance

Salt was subject to a duty in ancient Rome, and this example has been generally followed in modern states One of the most oppressive of the salt taxes in modern Europe was the French *gabelle* (See GABELLE) In Great Britain salt duties were imposed in the reign of William III In 1798 the tax amounted to 5s per bushel, but during the protracted struggle with France it was raised to 15s per bushel, or thirty times the cost of production It was abolished in 1823, but in several countries (as Austria,

Italy, India) salt is still an article from which a considerable public revenue is derived

SALTA, a province and town of the Argentine Republic The province, which is the frontier one to the north, extends from lat 26°s northwards to the confines of Bolivia, and consists of lofty mountain ranges, fertile valleys, and tracts covered with wood or pasture, with a climate varying from tropical heat in the eastern part of the province to intense cold in the mountain districts on the west The principal rivers are the Vermejo and the Salado It yields wheat, maize, indigo, cotton, and sugar, and the vine to a certain extent is cultivated, and some trade is carried on in mules Pop (1900), 131,938 —The town is about 800 miles north west of Buenos Ayres, at the bottom of a marshy valley, liable to occasional inundations, has a neat appearance, possesses a cathedral and several churches, but is unhealthy Pop 17,500

SALTASH, an ancient corporate town and port of England and parliamentary borough (till 1832) in Cornwall, on the Tamar, which is crossed by a fine railway bridge, 3 miles NW of Devonport Pop (1891), 2745, (1901), 3357

SALTBURN BY THE SEA, a town of Yorkshire, North Riding, 4 miles east of Redcar, which has recently risen into reputation as a watering-place It is delightfully situated upon lofty cliffs facing the German Ocean, and overlooking a little bay which extends to Redcar It combines the charms of maritime and inland scenery, in the latter of which the surrounding country is rich A deep glen, extending from the sands into the mainland, is profusely wooded, and is traversed by a rivulet of clear water It is crossed by a light iron girder bridge just before it opens out to the sea From the parapet of the bridge, which is 130 feet high and 2100 feet long, a fine view of the ocean and of the scenery of the Cleveland Hills is obtained There is also a promenade pier stretching 1500 feet into the sea Pop (1891), 2232, (1901), 2578

SALTCOATS, a town of Scotland, on the Firth of Clyde, in the county of Ayr, 29 miles south west of Glasgow, with which it is connected by rail The older portion of the town is irregularly built, but many fine villas and cottages have been recently erected The chief industrial concerns are coal mines, iron foundries, and dynamite works Pop (1891), 5895, (1901), 8121

SALTILLO, a town of Mexico, capital of the state of Coahuila, at the foot of a hill in a fertile district on the left bank of the Tigre, near the frontiers of Nuevo Leon, 470 miles NNW of Mexico It is a well built handsome town, and has extensive manufactures of woollen blankets and serapes or ponchos Pop (1895), 26,801

SALTING See PRESERVED PROVISIONS

SALT LAKE, **GREAT** See **GREAT SALT LAKE**

SALT LAKE CITY, the capital of Utah, United States, on the Jordan, which enters Great Salt Lake about 10 miles below it It stands at the base of the Wahsatch Mountains, more than 4000 feet above sea-level, and consists of spacious, regular streets lighted by gas and electricity and many of them traversed by tramways It is the head quarters of the Mormons, and was founded in 1847 by Brigham Young, the successor of Joe Smith There are a great Mormon temple, tabernacle, and assembly hall, a university, a cathedral, mining institute, hospital, theatres, &c Pop (1880), 20,768, (1890), 44,843, (1900), 53,531

SALTPETRE See **POTASSIUM**

SALTS, **SMELLING**, a preparation of carbonate of ammonia with some agreeable scent, as lavender or bergamot, used by ladies as a stimulant and restorative in fits of faintness

SALUTE, ARMY and NAVY, the firing off of guns in honour of any person of rank or distinction, or on any occasion of state. A royal salute is twenty-one guns.

SALUZZO, a town of Northern Italy, capital of the district of same name, in the province of Cuneo, 30 miles south by west of Turin, partly on a hill, and partly in a plain between the Po and the Varaita. It is the see of a bishop, and has a large and handsome cathedral, erected in the fifteenth century, and the former residence of the Marquises of Saluzzo, now converted into a house of correction. Pop. 9796

SALVADOR. See SAN SALVADOR.

SALVAGE, a recompense allowed by law for the saving of a ship or goods from loss at sea, whether the loss be by shipwreck or other means.

SALVATION ARMY, THE, a religious society originated by William Booth, in the east end of London, in 1865, and known as The Christian Mission until 1878, when the present name was adopted, its object being to bring religious and moral influences to bear on the lowest classes and such as were uncared for by any religious agency. Mr Booth's chief helper at first was his devoted wife, the converts were employed in extending the operations of the mission, and its numbers soon increased. Beginning in a tent, then occupying a dancing saloon, making use of cellar, or shed, or railway arch, or old factory, the work spread with great rapidity. People disused to church or chapel eagerly heard and embraced the gospel when presented to them in an unconventional form, many thousands of the worst characters were reclaimed from vicious lives, and the movement has now extended into a great many foreign countries and colonies, so that in 1900 there were 6822 'corps' and outposts, in forty seven different countries, 109 homes for fallen women, 139 slum posts, 157 shelters and cheap food depots for the homeless, 77 work shops and factories, 25 labour bureaux, 13 farms, &c. The number of officers and local officers was 58,059. The principles of the army are the doctrines commonly accepted among Evangelical Christians, and agree in the main with the teaching of John Wesley, emphasizing such points as prompt repentance, immediate acceptance of God's mercy in Christ, justification solely through the death of Jesus Christ and by faith, regeneration by the Holy Spirit, and a full salvation from all sin with perfect love to each other, to the churches, and to all men. Their methods are avowedly unconventional, and consist in processions of uniformed men and women soldiers, led by bands of music, and singing salvation songs along the streets, open air services, meetings in the halls or barracks, where all stiffness or formality is avoided, and short addresses, prayers, &c., are interspersed with choruses. The officers are drawn from the ranks, as many women as men, in many cases more remarkable for their earnestness than for education or refinement. They have no guaranteed salary, but receive an allowance deemed sufficient to maintain them and no more. The dark blue uniform is worn by officers and soldiers, except in heathen countries, where a dress more in keeping with the habits of the people is usually adopted. It attracts attention, is regarded as a safeguard against worldly fashion, and if it sometimes provokes abuse it as frequently conciliates respect. The government of the army is military in form, at its head being Mr Booth, the 'General,' under whose control are all the operations of the army throughout the world, and all members must conform to the regulations laid down. The poorest of the community form the principal sphere of the army's efforts, and it is their benefit and convenience that is largely considered in all the arrangement and conduct of the organization. In

the worst and lowest slums of English and American cities female officers constantly reside, visit, nurse, and impart religious teaching. There are rescue homes for fallen women, depots for cheap food, and shelters for outcasts, open day and night, in London. Every salvationist is an abstainer, and the army is thus the largest temperance association in the world. It is also a great missionary society. Its policy is to adapt itself to each country, to adopt the dress and usages of the natives, and to support the work by the offerings of the people themselves. The War Cry is the official organ of the army in the United Kingdom, and the Young Soldier is its children's paper. There are one or two monthlies—All the World, and the Deliverer. Abroad there are separate issues of the War Cry in various languages, the official organs of their respective countries. There is a considerable salvation army literature. Among the most important books are those published by the General and Mrs Booth on various practical subjects. One of these published in 1890, and entitled In Darkest England and the Way Out, led to the raising of a fund of over £100,000 for the benevolent objects of Mr Booth. There were 500,000 'soldiers' in 1895.

SALVATOR ROSA. See ROSA.

SALZBURG, a city of Austria, on the Salza, 63 miles south east of Munich, the capital of the duchy or province of the same name. It is partly walled and has several handsome squares and streets, ornamental grounds, park, and river promenades. The chief edifice is the cathedral, more remarkable for solidity than elegance. Other buildings are the archbishop's palace (now belonging to the town), imperial palace, exchange, and museum. There is a theological college, and other high class educational institutions. Salzburg was the birthplace of Mozart. Pop (1900), 32,934. The most striking feature of the place is its romantic situation amidst lofty mountains.—The duchy or crownland of Salzburg, area 2767 square miles, is a rugged mountainous country, intersected by numerous valleys, of which that of the Salza is the principal. These valleys are chiefly pastoral, but in many of them much corn and fruit are raised. Wood is abundant, and the minerals, which are very valuable, include gold, silver, lead, copper, cobalt, iron, salt, and marble. Pop (1880), 163,566, (1890), 173,510, (1900), 193,247.

SALZKAMMERGUT, a district in Upper Austria, in the south east corner between Salzburg and Styria. It is alpine throughout, is watered by the Traun, contains the beautiful Lakes of Traun and Hallstadt, and from its wild and romantic character has received the name of Austrian Switzerland. It has little arable land, but rears great numbers of cattle, is well wooded, well supplied with game and fish, and is rich in minerals, including marble, coal, and more especially salt. The chief towns are Ischl and Laufen. Pop 20,000.

SALZWEDEL, a town of Prussia, 54 miles N N W of Magdeburg, on the Jeetsel, with manufactures of woollen, linen, and cotton goods. Pop (1895), 9964.

SAMAR, an island in the Indian Archipelago, belonging to the Philippines, of which it is a province, and separated by channels on the north from Luzon, and on the south from Leyte, length, 147 miles, average breadth about 50 miles. It is densely wooded, well watered, and traversed by lofty and rugged mountains. The principal products are cocoa, rice, palm oil, hemp, wax, and indigo. The capital is Catbolagan, on the west coast. Pop 194,000.

SAMARA, a government of Russia, on the left bank of the Volga, formed by a ukase of December 18, 1850, and consisting of three districts of the government of Orenburg, two districts of the government

of Saratof, and of the districts of Samara and Stavropol, in the government of Simbirsk Area, 58,321 square miles. A great part of the province is flat and fertile, but at present lies in the form of uncultivated steppes. There is little wood. Wheat and other kinds of grain are the chief products. There are a considerable number of Swiss and German colonists here, also Nogai Tartars, Bashkirs, and Kirghis. Pop (1897), 2,763,478.—**SAMARA**, the capital, is situated at the confluence of the Samara with the Volga. It is the seat of a bishop, has manufactures of leather, soap, machinery, &c., and carries on an extensive trade, particularly in caviare, and fresh and salt fish, corn, wool, skins, and hides. Pop (1897), 91,672.

SAMARIA, or **SEBASTE**, an ancient town of Palestine, formerly capital of the Kingdom of Israel, finely situated on a hill, 36 miles N.W. of Jerusalem. Samaria was built by Omri, king of Israel, about B.C. 925, and continued to be the metropolis of the ten tribes till they were carried away into captivity by Shalmaneser about two centuries after, or B.C. 720. After having been razed to the ground and again rebuilt, it was given by Augustus to Herod, who, in honour of the emperor, gave it the name of Sebaste, a Greek term equivalent to the Latin Augusta, surrounded it with a strong wall, and adorned it with many splendid structures. The Roman province of Samaria formed the central portion of Palestine. The insignificant village Sebastich now represents the ancient Samaria. There is here a half ruined church (now a mosque), dedicated to John the Baptist, because, according to tradition, either the scene of his martyrdom or place of his burial.

SAMARITAN PENTATEUCH, an ancient version of the five books of Moses, which has been preserved by the Samaritans, and along with the book of Joshua constitutes their sacred scriptures. After a good deal of controversy it appears to be pretty generally agreed that the Samaritan Pentateuch is a recension of the same original with the Jewish, and, though possibly less pure, possesses an independent value in determining the text. It is written in a different character, which is probably an older form of the Hebrew, and there are literal differences which are noted as important by Hebraists, but the different readings of the text, which are numerous, and some of them important, constitute a far more important distinction. A manuscript copy of the Samaritan Pentateuch is in existence which is said by the Samaritans to have been written by Abishua the great grandson of Aaron, and which is probably of considerable antiquity. There are various other manuscript copies of this version, besides a translation of it in the Samaritan tongue and one in Arabic, which superseded Samaritan as the common language of the people. The work was known only through references in Origen, Jerome, and other early writers until Pietro della Valle discovered a copy of it at Damascus in the early part of the seventeenth century. There are several printed editions.

SAMARITANS. After the fall of the Kingdom of Israel, the people remaining in its territory, consisting of the tribes of Ephraim and Manasseh, mingled with some Assyrian colonists, came to be known as Samaritans, from the city of Samaria, around which they chiefly dwelt. When the Jews on their return from captivity rebuilt the temple of Jerusalem, the Samaritans desired to aid in the work, but their offers were rejected by the Jews, who looked upon them as unclean, on account of their mixture with heathens, and the Samaritans revenged themselves by hindering the building of the city and temple. Hence the hatred which prevailed between the Jews and Samaritans, which, in

the time of Jesus, when the latter were confined to a narrow strip of country between Judaea and Galilee, prevented all intercourse between them, and still continues. Having never become independent the Samaritans have shared the fate of the country which they inhabit, and have suffered much from the oppression of the Turks. Nablus or Nabulus (the ancient Shechem) is now the chief centre where Samaritans dwell. In their religious opinions and usages they resemble those Jews, particularly the Karaites, who reject the Talmud, and differ from the rabbinical Jews in receiving only the Pentateuch and Book of Joshua, and in rejecting all the other portions of the Bible, as well as the Talmud and rabbinical traditions. In their rites and religious ceremonies they adhere strictly to the Mosaic law. Instead of the temple at Jerusalem they worship on Mount Gerizim, beside Nablus, where, in more prosperous times, they celebrated their festivals and offered sacrifices with some pomp and imposing solemnity. The worship of one God, circumcision, the purifications, and feasts (except the Purim and the feast of the Dedication), they have in common with the Jews. They believe in the existence of angels, in a resurrection and future retribution, and expect the coming of a Messiah, in whom they look only for a prophet. Their priests are regarded as being of the tribe of Levi, and are treated as superiors. On account of their poverty their only sacrifice is a lamb on the feast of Pentecost. In the synagogue the Aramaic Samaritan dialect is used, but they generally speak Arabic, and they are distinguished by a white turban. They support themselves by mechanical labour and by money dealings. They avoid any connections with other sects, and marry only among their own people. Each man is allowed two wives on his first marriage, but on the death of one of them he cannot marry again. In case both of them die he is permitted to have one wife. This remnant of a declining race possesses one of the oldest manuscripts of the Pentateuch known to be extant. See **SAMARIA**, **SAMARITAN PENTATEUCH**.

SAMARKAND, a city formerly belonging to the Kingdom of Bokhara, but now belonging to Russia, situated in a fertile and delightful region, 130 miles E. of the city of Bokhara, near the river Zerafshan. It has a citadel, contains numerous fountains, 250 mosques, a palace, several bazaars, &c. Samarkand has been for two centuries and a half one of the great marts of the Asiatic inland commerce. It was anciently called *Marakanda*, and was the capital of Sogdiana, which lay on the northern frontiers of the Persian Empire. Alexander is thought to have pillaged it. It was taken by Genghis Khan in 1220, and under Timour or Tamerlane became the capital of one of the most extensive empires in the world. Samarkand was surrendered to Russia by treaty of July 1868. Since then a well built Russian quarter with wide and regular streets has arisen, extensive irrigation works have been constructed, and the Transcaspian railway now extends to the city. Pop (1897) 54,900. See **BOKHARA**.

SAMBUR (or **SAMBOO**) **DEER**. See **RUSA**.

SAMNITES, the inhabitants of the ancient province of Samnium, in Lower Italy, bordering on the country of the Peligni, Marsi, Campanians, Lucanians, and Apulians. They were an offshoot of the Sabines, who emigrated from a neighbouring part of Italy prior to the founding of Rome, and settled in the country afterwards called Samnium, and at that time occupied by Opicans, whom they conquered, and whose language they adopted. The two most important tribes of the Samnites were the Pentri and Caudini, who occupied respectively the north and the

south sides of the *Matese*. To the former belonged the towns of *Sepinum*, *Bovianum*, and *Æsernia*, to the latter those of *Beneventum*, *Telesia*, and *Allifæ*. The *Samnites* are described in Roman history as a people fond of war and of liberty, who were brought completely under the Roman yoke after long and bloody wars, which continued with few interruptions fifty-three years. The first hostilities between the two states commenced in the year 343 B.C., when the *Campanians*, oppressed by the powerful *Samnites*, sought the aid of Rome. *Valerius Corvus*, the Roman consul, marched against the *Samnites*, and forced them to retreat after a bloody engagement to their own borders. At the same time another Roman army had invaded the country of the *Samnites*, and after a doubtful contest gained the victory by the heroic decision of the young *Publius Decius Mus*. The vanquished nation was obliged to sue for peace, but maintained it only till they recovered from their defeat. For in the year 327 B.C. a new war broke out, more bloody than the preceding, which was prosecuted the more obstinately, as the other states in Lower Italy came to the aid of the *Samnites*. Though the Romans were generally victorious, yet in the year 321 B.C. their army becoming involved in a narrow pass near the city of *Caudium*, and being surrounded on every side by the forces of the enemy, was obliged to submit to the disgrace of passing under the yoke. The senate, however, rejected the peace concluded with the enemy by the captive consul, delivered up the authors of it to the *Samnites*, and sent other commanders to prosecute the war. The valiant *Papirius Cursor* succeeded in revenging the disgrace which his countrymen had suffered by inflicting a similar ignominy upon the enemy. The war was still prosecuted with fury, for the *Samnites* were vigorously supported by their neighbours, who feared the power of Rome, and even *Pyrrhus*, the warlike king of *Epirus*, at the entreaty of the afflicted city of *Tarentum*, took up arms against the Romans. But the consuls *Papirius Cursor*, *Q. Fabius Maximus*, *Pub. Decius Mus*, *Curius Dentatus*, *Carus Luscinus Fabricius*, and others triumphed repeatedly over the enemy, who fought with desperation, and after the most fatal defeats, and the entire devastation of their country, the *Samnites*, together with the other nations which had assisted them, found themselves obliged to submit to the supremacy of Rome, 290 B.C. When the Italian allies of Rome revolted against her in the year 90 B.C. the *Samnites* once more rose against their oppressors, and fought with desperation. But *Sulla* entirely subdued them, and commanded that every *Samnite* should be put to death. Three days after the battle he ordered 4000 of them who had been taken prisoners to be put to death on the *Campus Martius*. The few that remained lived from that time scattered in villages. The *Samnites* cultivated various arts and manufactures, for the proximity of the refined Greeks in Lower Italy had a very beneficial influence upon them. Even their laws and constitution were borrowed in a great degree from the Greeks. Their form of government was democratic. At the commencement of a war they were accustomed to choose a common general.

SAMOAN ISLANDS See **NAVIGATOR'S ISLANDS**.

SAMOS, now **SAMO**, or **SOUSAM-ADASSI**, an island in the Grecian Archipelago, 45 miles south west of *Smyna*, forming a principality tributary to Turkey, greatest length, east to west, 25 miles, central breadth, about 12 miles, area, 213 square miles. It is separated from the coast of Asia Minor on the east by a narrow channel, called the *Little Bog haz*, not more than $\frac{1}{2}$ mile wide, and from *Nikaria*

and the *Furni Islands* on the west and south-west by another channel, called the *Great Bog haz*, nearly 8 miles wide, and with its north coast forms the south side of the Gulf of *Scala-Nuova*. Its coast furnishes several good harbours, well situated for commerce, and its interior is traversed by two mountain ranges, mostly rocky and barren, but occasionally relieved by pine forests, while their lower slopes are covered with vineyards and olive yards. The valleys are generally well watered and fertile, and present much beautiful scenery. Besides corn, fruit, and vegetables, the vine is extensively cultivated, and produces excellent *Muscadine* wines which are much esteemed in the Levant. The minerals include silver, lead, antimony, calamine, manganese, and copper. White marble is particularly abundant, as most of the rocks are composed of it. The capital and principal town is *Vathy*, which is situated on the north side, and has a commodious harbour. The former capital, *Khora*, is a miserable place on the south side of the island, not far from the site of the ancient *Samos*, which was once among the most flourishing cities of Greece. It had a fine harbour, and numerous splendid buildings, including the Temple of *Hera* (the *Heræum*), which was celebrated for its magnificence and size, situated on *Cape Colonna*, the most southerly promontory on the island, and now represented by insignificant remains. *Samos* is celebrated as the birthplace of *Pythagoras* and other illustrious men. It was inhabited in antiquity by *Ionian Greeks*, and was fabled as the native place and favourite abode of *Hera*. It was erected into a principality in 1833, and is governed by a Greek prince, who pays £2000 a year to the Porte. Wine, raisins, hides, leather, oil, brandy, tobacco, and carob beans are the chief articles of export. Pop (1900) 51,830.

SAMOTHRACE, or **SAMOTHIRAKI**, an island of Turkey in Europe, in the northern part of the *Archipelago*, 40 miles north west of the entrance to the *Dardanelles*, greatest length, east to west, about 14 miles, breadth, about 8 miles. It is of a somewhat oval shape and very mountainous, one of its summits, *Saocet*, rising 5248 feet above the sea. Its principal products are corn, oil, honey, and wax. It also feeds a considerable number of goats. On its north west coast are the ruins of ancient *Samothrace*. The island receives its greatest interest from the circumstance that it was the chief seat of the worship of the *Cabiri* (see *CABIRI*), and celebrated for its religious mysteries, which were some of the most renowned in the ancient world. It is interesting also as being visited by *St Paul* in the course of his second missionary expedition (*Acts* xvi 11).

SAMOYEDES, or **SAMOIENES**, a Mongolian people inhabiting the shores of the Arctic Ocean, from the *Kamir Peninsula*, on the eastern shores of the *White Sea*, to the Gulf of *Khatanga*, in the north east of the government of *Yeniseisk*. They consist of three principal tribes, speaking different dialects. Their origin is unknown, but they are supposed to have come from more southern regions, and have been erroneously confounded by the Russians with the *Lapländers*, whose country, called in the *Lapland tongue* *Sameeanda*, has probably given them their name. They are nomadic, and live chiefly by fishing and keeping reindeer. They are of small stature, usually between 4 and 5 feet, have a flat, round, and broad face, thick lips, wide nose, little beard, black hair, in small quantity. They live by hunting, are extremely superstitious, and generally peaceable. As they are unacquainted with the art of writing their traditions are imperfectly preserved only in their songs. When the victorious Russians first became acquainted with them they had already been chased from their native seats by the *Tartars*, and

separated from their kindred tribes. Their principal wealth consists in herds of reindeer, which supply them with food, clothing, tents, utensils, &c.

SAMPHIRE (*Crithmum maritimum*), an umbelliferous plant, very succulent, pale green, with bi-trinervate leaves and lanceolate fleshy leaflets, it grows wild along the sea-coast of Europe. Where it abounds it is used by the inhabitants as a pickle, as an ingredient in salads, or as a potherb. It can be cultivated in gardens upon beds of sand and rubbish, or in pots, and it is useful to furnish the stocks with a supply of salt, for like other maritime plants it possesses the power of decomposing sea-water and retaining the soda. The seed resembles a grain of barley.

SAMSON (Hebrew, *Shimshon*, of uncertain import), an Israelite of the tribe of Dan, the son of Manoah, and the most remarkable of those who attained the position of Judges over Israel. The time of his birth is somewhat indefinite, but apparently it happened towards the close of the period embraced in the history of the Book of Judges, and after Israel, for a fresh defection, had been delivered to a Philistine servitude which lasted forty years (Judg. xiii. 1). The circumstances attending his birth, heralded as it was by an angel of the Lord, his consecration as a Nazarite from the cradle, and those supernatural visitations of the Spirit of the Lord through which he was enabled to perform those astonishing feats of heroic might against the enemies of his country, all mark him out as an extraordinary man, a man divinely raised up to meet a special emergency in the history of the chosen people. Other individuals are indeed spoken of in Scripture as endowed with supernatural power by the Spirit of the Lord, and others are also referred to as Nazarites, but 'the connection of supernatural power with the integrity of the Nazarite vow, and the particular gift of great strength of body, as seen in tearing in pieces a lion, breaking his bonds asunder, carrying the gates of the city upon his back, and throwing down the pillars which supported the house of Dagon, are quite peculiar to Samson. The first recorded instance of the exercise of his great strength is in connection with his marriage to a daughter of the Philistines. At the wedding feast Samson, who had formerly torn a lion in pieces, and afterwards found a swarm of bees in the carcass, proposed a riddle to the guests, wagering thirty shirts and as many suits of clothes that they could not guess it in seven days. 'Out of the eater came forth meat, and out of the strong came forth sweetness.' The secret of his riddle being betrayed to them by his bride Samson reproached them with ploughing with his heifer, but went to Askalon, killed thirty Philistines, and gave their clothes to his guests. His wife having, during his absence in his own country, married again, he caught 300 foxes, and tying them together tail to tail, with a fire brand between them, let them loose in the fields of the Philistines. His own countrymen having afterwards delivered him up bound into the hands of his enemies he snapped the cords asunder, and killed 1000 Philistines with the jaw bone of an ass. From this period Samson was judge of Israel for twenty years. While he was on a visit to Gaza the gates of the city were watched by the Philistines, with the intention of killing him as he went out in the morning, but he rose by night and carried off one of the gates of the city to a distance of 20 or 30 miles. Not long after he fell in love with Delilah, to whom he foolishly revealed the secret of his strength. By cutting off his hair, which was a violation of his obligation as a Nazarite, she deprived him of his peculiar powers, and betrayed him to his enemies, who put out his eyes, and set

him to work in a mill with slaves. At a great festival in honour of Dagon Samson was brought out to furnish sport to the Philistines. But his hair had grown again, and his vigour having returned with it he took vengeance on his enemies by pulling down over their heads the building in which they were assembled, and under the ruins of which he also perished with them. Milton has made his death the subject of a drama—*Samson Agonistes*.

Some authors of the Rationalistic school find in what they term the legend of Samson only an Israelitish form of the fabled exploits of Hercules, but as this view has nothing properly to rest upon but a few formal resemblances, coupled with a desire to get rid of everything supernatural, it is unnecessary to go into detail. It is not improbable, however, that stories of Samson's prowess may have been carried, through the medium of Phœnician traders, to Greece and Italy, and there moulded according to the taste or imagination of those who heard them, and transferred to a hero of their own.

SAMSOON, or **SAMSUM**, a seaport, Asiatic Turkey, in the pashalic of Sivas, on the Black Sea, 166 miles W N W of Trebizond. It has a castle, now converted into a prison, several large stone khans, and small but well supplied bazaars. The roadstead, though open, is considered safe, and an important trade, chiefly with Constantinople, is carried on. Pop. 10,000.

SAMUEL (Hebrew, *Shemuel*, 'asked from,' or 'heard of God'), the first of the order of prophets, and the last of the judges of Israel. He was the son of Elkanah, of Ramathaim-zophim, belonging to the tribe of Levi, by Hannah. Hannah had been barren previous to the birth of Samuel, but she prayed earnestly to the Lord for a man child, and vowed that if her petition were granted she would consecrate the fruit of her womb to the Lord all his days. Her prayer being heard she fulfilled her vow, and took her son to Shiloh to surrender him to the high priest to be trained to the service of the Lord. From the time when, as a youth, he was visited by God in the silence of the night, and had the disasters revealed to him that should befall the house of Eli, Samuel was marked out as destined by God to reform the dissolute and irreligious practices of his nation. He grew up devoted to the temple service, but after the death of Eli we hear no more of Samuel for a space of about twenty years, whilst the ark, restored by the Philistines, was in the house of Aminadab. At the end of that time we find him exhorting the Israelites, when they were hard pressed by the Philistines, to abandon their idolatry, and to fear God and worship him, as their only means of deliverance. His prayers and sacrifices obtained for them the victory at Mizpeh, and it is probable that from this time, and in consequence of the leading part Samuel then took, he obtained the name and authority of judge, in addition to those of prophet or seer. He mentions his own name in the list of *warlike chiefs* by whom the Lord sent deliverance to his people, and it is recorded that he judged Israel as civil ruler all his life, going a yearly circuit from Ramah, where was his home, to Bethel, Gilgal, and Mizpeh. At Ramah he built an altar to the Lord. His administration was distinguished by the restoration of the neglected worship of Jehovah. He also gave a new vigour to the theocratical institutions of Moses by the establishment of schools of the prophets (See **PROPHETS**). In his old age the corruption of his sons, to whom he had transmitted the active duties of the office of judge, excited discontents among the Hebrews, who demanded a king. Samuel reluctantly yielded to this revolution, but at the same time anointed the king of the general choice, imposing

upon him such restrictions as should preserve the old constitution, and reproving him freely when he was guilty of injustice or impiety. After the establishment of the monarchy Samuel still continued to be judge in matters affecting morals and religion, in addition to the exercise of his prophetic functions, though he no longer acted as military commander. In his bearing towards Saul Samuel conducted himself with wonderful dignity and kindness, and though he had opposed the appointment of a king, yet when the appointment was actually made he accepted the change with a good grace. He earnestly desired that Saul, as king, should rule well in the fear of the Lord, and that his dynasty should be permanent. As a prophet he pointed out to Saul his duty, and then avoided all occasions of rivalry and partisanship by retiring to Ramah. The occasions on which Samuel left his seclusion to come into direct collision with Saul will be found alluded to under the article SAUL. When Saul attacked the priestly office and privileges Samuel anointed a new king, David. He did not live to see the contest between David and Saul decided, but even after his death his spirit, evoked by the witch of Endor, threatened the latter with the divine vengeance.

SAMUEL, Books of. The two books of the Old Testament which go under this name received the designation at a period subsequent to the completion of the Septuagint translation, in which they are denominated *Basileiōn Protē* and *Basileiōn Deutera*, First and Second of Kings, a term more in consonance with the contents of the books than the later one. The name may in some measure be explained and justified on the ground that the early part of the first book is chiefly concerned about Samuel, and that the two kings, Saul and David, whose reigns occupy all the rest of the books, were both appointed by Samuel to their office. In Hebrew MSS the work is one, the division into two books being first introduced by Bomberg, in 1518, at Venice. The contents of the books present us with a more or less consecutive narrative of events relating to the Israelites, from the priesthood of Eli to the death of David. The principal periods embraced in the record are—the restoration of the theocracy under Samuel (book 1, chaps 1–xii B.C. 1171–1095), the history of Saul's reign ending with his death (book 1, chaps xiii–xxxi B.C. 1095–55), and the history of David's reign (book 2 B.C. 1055–15).

As regards the authorship of these books it is evident they could not have been written by Samuel, since his death is recorded in book 1 chap xxv. There is a somewhat common opinion that the first twenty-four chapters were written by Samuel, and the rest by Gad and Nathan—an opinion founded on 1 Chron. xxix 29 'Now the acts of David the king, first and last, behold they are written in the book of Samuel the seer, and in the book of Nathan the prophet, and in the book of Gad the seer.' There is much in the general structure of the books, and in the relation of the several parts to each other, to render it probable that different writers living at different times were concerned in their production, notwithstanding the degree of uniformity which the style and language exhibit. Perhaps the most reasonable supposition is that they were the work of one compiler, who used historical records of various sources. The high antiquity of the books of Samuel, or of the sources whence they were principally derived, in comparison with that of the Kings and Chronicles, appears from the absence of reference to older sources or authorities in the former, such as is frequently made in the latter. To only one work is direct reference made, namely, to the Book of Jasher (2 Sam. 1. 18). It hence appears that the

compiler did not live at any great distance from the events which he relates, and therefore does not deem it necessary to refer his readers to sources already known to them, whilst the original sources have for the most part all the marks of having been written by persons contemporaneous with the events described. With the exception of a brief expression in the Talmud—'Samuel wrote this book,' there is no opinion expressed by antiquity respecting the name of the author. By modern writers a variety of opinions have been held, some attributing the books to Jeremiah, some to Ezra, and some to Isaiah. The great number of words, however, and forms of words, peculiar to this work point out a distinct author and age, and it would seem most likely that it was compiled in an early period after the death of David, and previously to the rearing of the kingdom under Rehoboam. As regards the identity of expression between certain passages in the books of Samuel and in the Chronicles it may be assumed that either the latter drew upon the former, or, which is more probable, from internal evidence, that they both drew from the same source. The historical credibility and canonicity of these books cannot be fully discussed here. The internal evidence of their truthfulness and the external evidence of their canonical authority are both complete. The style in which they are written is simple, natural, and bold. Places, times, and other minute details are freely and artlessly given. The course and connection of the history carry with them the proof of their truthfulness. The characters and events are in accordance with the times in which they are placed, and attempts to establish contradiction and discrepancy have failed. Succeeding Scriptural writers refer to the persons and occurrences of these books as real and true. See Ps xcix 6, Jer xv 1, Matt xii 14 Acts 1 24, and Heb xi 32. Of the commentaries on Samuel we may mention those of Otto Thennius, Keil and Delitzsch, and Hensler Konigsfeldt. See also Driver's work on the text (1890).

SANA, or SANAA, a town in south western Arabia, in Yemen, formerly residence of an independent prince, now of the Turkish governor of Yemen, fifteen days' journey N.N.E. of Mocha, and north of Aden. It is of very great antiquity, is finely situated in a valley about 4000 feet above sea level, and has been declared to be in many respects one of the handsomest cities of the East. The streets are comparatively wide and clean, and the whole town, with its suburb Bir el Azab, is inclosed by a wall exceeding 5 miles in circuit. The houses, though closely packed, are often massive, lofty, and whitened or painted, and many of them have windows of stained glass. Some of the modern residences of the Turks are villas in the European style, surrounded by walled gardens. The principal mosque is of recent erection, and is a handsome building with domes and minarets in the Turkish style. The chief manufactures are articles in gold and silver, gunpowder, sword blades, &c., and the trade is in coffee, the great staple, dried fruits, and raisins. Sana was visited by Mr W. B. Harris, F.R.G.S., in 1892. Population of city about 58,000.

SAN ANTONIO, a town of Texas, United States, on the San Antonio River, 80 miles s.w. of Austin City. The chief buildings are the court house, United States government building, various churches, Roman Catholic cathedral, besides handsome banks and elegant residences. It is the centre of a fertile country, of which cattle, cotton, and wool are the staple products. There are carriage and wagon works, breweries, tanneries, grain mills, &c. It was founded by the Spaniards in 1714, and has a large trade with Mexico. In March, 1836, a small garri-

son, numbering 150 Texans, offered a brave resistance to an overwhelming body of Mexicans, but they were all slaughtered. Pop (1890), 37,673, (1900), 53,321.

SAN CARLOS, JOSEPH MICHAEL DE CARVAJAL, DUKE OF, descended from the old kings of Leon, was born in Lima, in 1771, went to Spain at the age of sixteen, began his military career as colonel in the second regiment of Majorca infantry, of which his uncle was colonel proprietor, was in the campaign of Catalonia, in the war of 1793, and a volunteer in the Toulon expedition. On the death of his uncle he was appointed chamberlain, and subsequently in 1796 governor to the Prince of Asturias, afterwards Ferdinand VII. His system of education was, however, not suitable to the views of Godoy, whose influence deprived the duke of that post. In 1805 he was invested with the office of major domo to Charles IV, and in 1807 was appointed to the viceroyship of Navarre. Three months after he had taken possession of his viceroyalty he received orders to consider himself a prisoner in the citadel. This arrest arose out of a report that the duke had recommended to the prince to remove the queen mother from all influence in the affairs of the kingdom, in case of the king's death, who at that time was very ill. During the affair of the Escurial (see FERDINAND VII.) he was subjected to various severe scrutinies, and though liberated at the same time as Prince Ferdinand, he was ordered to remove 60 leagues from Madrid, and was prohibited from fixing his residence in Navarre. He resided at Alfaro when the French armies entered Spain. In the meantime the insurrection in Aranjuez broke out, and Prince Ferdinand being placed on the throne, he immediately called the duke about his person, and appointed him grand master of the household and member of his privy council. He arrived in Madrid some days before the prince's departure for Bayonne, and accompanied him in that journey. The duke had several conferences with Napoleon on the subject of exchanging the crown of Spain for that of Etruria, and invariably assured him that the prince would not consent to any treaty without enjoying his liberty and being sanctioned by the cortes. The subsequent arrangements, however, which the prince was compelled to enter into did not detach the duke from his service; he remained with him at Valençay till, by the order of Napoleon, he was called with Escoiquiz to Paris. Suspicious, however, being entertained of the duke and Escoiquiz's influence over Ferdinand, they were separated from that prince, the duke being confined at Lons le Saulnier, and Escoiquiz at Bourges. The duke, in his retirement, cultivated his taste for botany, but above all, for history, politics, and general literature. When it was determined by Napoleon to reinstate Ferdinand on the throne of his kingdom, he fixed upon the Duke of San Carlos as best suited by his counsels and knowledge of all parties in Spain to conciliate their regards. He was therefore called to Paris in November, 1813, and afterwards went to Valençay, where long discussions ensued, which ended in the duke's setting out for Madrid, to obtain the consent of the regency to the treaty. He arrived January 16, 1814, but the arrangements made in France were not approved by the regency. In answer to applications for the return of the king to Spain the Duke of Bassano at length consented to the measure, and his majesty set out under the name of Count de Barcelona. The duke was the only minister who accompanied the king. The affairs of Spain were at that time under the direction of the regency, and under these circumstances it was deemed prudent to go to Saragossa. The cortes, however, decided not

to give up the reins of government, and the king and the duke proceeded to Valencia in April. May 3 San Carlos was appointed by the king first secretary of state and the next day he signed the infamous decree by which a despotism was established. General Freyer, who had been nominated to the ministry of war, declined the place, and the duke accepted it, in conjunction with that of minister of the king's household the former office he shortly after resigned to General Eguia. The duke set about introducing a system of economy into the kingdom, established a junta of ministers over whom he presided, took measures for repairing roads, increasing the number of canals, reviving the credit of the national bank, and instituting several academies for the cultivation of the arts and sciences. Notwithstanding these benefits his enemies were numerous, and finding them increase in November, 1814, he demanded permission to resign, which the king granted, and Don Pedro Cevallos was appointed to succeed him. He was nominated minister to Vienna in the month of October, 1815, and in 1817 he was recalled and sent to the court of Great Britain in the same quality. In consequence of the troubles in Spain (1822-23) the duke retired to the court of Lucca, by which he was sent ambassador to Charles X, in 1825. He was subsequently named ambassador extraordinary of Spain to the same court, and continued in that station till his death, July, 1828.

SANCHUNIATHAN, or SANCHONIATHON, the name prefixed, as that of the author, to a history of Phœnicia and Egypt, entitled *Phœnikika*, and published by Philo of Byblus, a grammarian of the second century, as a Greek translation from the Phœnician. According to Philo, Sanchuniathan was a native of Berytus, a Phœnician town a few miles from his own native place, and flourished during the reign of the Assyrian queen Semiramis. On the other hand, Athenæus, Porphyry, and Suda speak of him as a Phœnician living before the Trojan war. Some critics maintain that no such person ever existed, and that the work attributed to him was the composition of Philo himself, or, as others think, of Eusebius, who fathered their own speculations on ancient authority. No traces of the original work exist, and even of the translation, if it is a translation, only a few fragments remain. A considerable fragment of the work is preserved in Eusebius, who quoted Sanchuniathan as an historical evidence in corroboration of certain biblical statements which Porphyry had assailed with the same weapons. The Greek fragments still extant were published by Orelli (Leipzig, 1826) and by C. Müller (1849), and were the occasion of much keen controversy. Those who deny the authenticity of Sanchuniathan agree, however, in allowing the fragments current under his name a certain intrinsic value, they being founded on real ancient myths, and this is now, with certain modifications, the prevailing opinion. The conclusion arrived at by Renan, one of the investigators of the subject, is that a Phœnician of the time of the Seleucides, whose real or feigned name was Sanchoniathon, wrote in Phœnician a work on history and mythology, and that a free translation of this was afterwards made by Philo of Byblus. In 1837 Friedrich Wagenfeld published at Bremen what purported to be the entire Greek text of Philo's Sanchoniathon, said to have been discovered in a convent in Portugal, but the work was afterwards proved to be a fabrication of the editor.

SANCROFT, WILLIAM, an English prelate, born in 1617 at Fressingfield, in Suffolk. He early gave proofs of great talent, and studied at the University of Cambridge with a view to the church. He had

obtained a fellowship, but was deprived of it in 1642 because he refused to subscribe the Solemn League and Covenant. After the Restoration he obtained rapid preferment, and became successively Dean of York and St. Paul's, and in 1668 Archbishop, and in 1678 Archbishop of Canterbury. James II apparently found him a less willing tool than he had expected, and on his refusing to publish his declaration for liberty of conscience, and uniting with six other prelates in petitioning against it, sent them all to the Tower. Their trial and acquittal form an important page in English history, and had great influence in producing the final expulsion of the Stuarts. Sancroft, however, was not destined to profit by the expulsion. On the Revolution settlement he became a nonjuror, and thereby forfeited his archbishopric. He was succeeded by Tillotson, and retired to his native place, where he lived secluded till his death in 1693. Sancroft published some sermons, *Modern Politics*, and one or two other works of little permanent value.

SANCTIFICATION is the term applied in Scripture, as well as in theology, to denote the progressive renewal of the fallen nature of man from a state of unholiness to one of holiness. It is the process by which the effaced image of God in man is restored, and the sinner becomes a saint, the power of evil within him being destroyed, and the power of holiness quickened, educated, and strengthened. The work, which is one of grace, is begun and carried on by the Holy Spirit, in co-operation with the will of the individual himself (Rom. xv. 16, 2 Cor. vii. 1, 1 Thess. iv. 3, 4, 1 Pet. i. 15), and its completion is the final degree of holiness by which sinners are made 'meet to be partakers of the inheritance of the saints in light' (Col. i. 12). Sanctification is distinguished from justification in this, that while justification changes the state of the sinner in law before God as a judge, sanctification changes the heart before him as a father. Justification precedes, and sanctification follows as the fruit and evidence of it, the one removing the guilt, the other the power of sin. The former is an act done at once, the latter is a gradual process. The two are inseparably connected, as he who is made righteous, or justified, is necessarily made holy, or sanctified. In Roman Catholic theology the distinction between justification as the first stage and sanctification as the gradual development of the divine life in man is not so rigidly maintained as by Protestant theologians.

SANCTION, PRAGMATIC. See **PRAGMATIC SANCTION**.

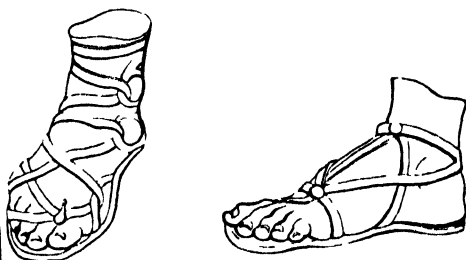
SANCTUARY, RIGHT OF, is the privilege attaching to certain places in virtue of which criminals taking refuge in them are protected from the ordinary operation of the law. Among the Jews this protection was afforded by their cities of refuge to any one who killed a man unawares, and a somewhat similar provision is traceable among heathen nations. From the time of Constantine downwards certain churches were set apart in many countries to be an asylum for fugitives from the hands of justice. This seems to have been originally intended only to prevent sudden violence, and to give time for the regular administration of the law. But in England, particularly down to the time of the Reformation, any person who had taken refuge in a sanctuary was secured from punishment—except when charged with treason or sacrilege—if within the space of forty days he gave signs of repentance, and subjected himself to banishment. Sanctuaries did not gain the name of such till they had the pope's bull, but the king's grant was sufficient to give these places full privilege of exemption from temporal courts. The immunity of these privileged places was very much curtailed by

a statute of Henry VIII., and by the 21 Jac. I. cap. xxviii. all right of sanctuary was wholly abolished. Various precincts, however, in and about London, known as sanctuaries, continued to afford protection to debtors, all which were done away with in 1697 by act 8 and 9 Will. IV. cap. xxvi.

In Scotland the Abbey and Palace of Holyrood, with their precincts, including Arthur Seat and the Queen's Park, have the privilege of giving sanctuary to debtors. The whole precincts are placed under the direction of a baillie appointed by the Duke of Hamilton, as hereditary keeper of Holyrood House. When a person takes refuge in the sanctuary he is protected against personal diligence for twenty-four hours, but in order to enjoy it longer he must have his name enrolled in the books of the baillie of the abbey. No protection is afforded to a criminal, a crown debtor, or a fraudulent bankrupt, nor is the debtor protected against diligence for such debts as he may have contracted within the sanctuary, for which he may be incarcerated in the abbey prison. The privilege of sanctuary in Holyrood is now almost entirely of antiquarian interest since the abolition of imprisonment for debt.

SANDA, a small island of Scotland, in the county of Argyle, and on the coast of Kintyre, about $1\frac{1}{2}$ mile long and $\frac{1}{2}$ mile broad. Paterson's Rock, a dangerous sunken reef, lies to the south-east of Sanda. The island is noted in mediæval history as a station of the Scandinavian fleets during the contests for the possession of Cantyre and the Hebrides. There is a lighthouse, 165 feet high, with a fixed red light, on the island.

SANDAL, a kind of covering for the feet used among the ancient Jews, Greeks, and Romans, and which we find to be of the highest antiquity. It



usually consisted of leather, or of a thick cork sole covered above and beneath with leather and neatly stitched on the edge. It left the upper part of the foot bare, and was fastened on by means of straps, crossed over and wound round the ankle. In later times sandals became articles of much luxury, being made of gold, silver, or other precious material, and beautifully ornamented.

SANDAL-WOOD (*Santalum album*, natural order Santalaceæ). This tree is a native of India, and is remarkable for its fragrance. It is sometimes used as a perfume. In India it is also employed as a sedative, and for its refrigerant properties. The wood is manufactured into light articles of cabinet furniture. The dust of the wood is used by the Brahmans to form the pigment with which they give the frontal mark to the god Vishnu, and the oil used in their ceremonies is obtained from the shavings, or at least scented by them. The true sandal wood grows chiefly on the coast of Malabar and in the East Indian Islands.

SANDAL-WOOD ISLAND, **SUMBA**, or **JEEN-DANA**, an island in the Indian Archipelago, south of Flores, lat. (eastern extremity), $10^{\circ} 0' S$, lon. 120°

45' E. Area of the island, 5000 square miles, with a population estimated roughly at 400,000. The southern point of the island terminates in a peninsula almost as high and apparently as inaccessible as the rock of Gibraltar, having a spacious bay on each side of it. The other coasts of the island are generally bold, and no soundings are got until near the shore in some places. The interior of the island is still imperfectly known. The natives are described as warlike, and as being equipped with long lances, coats of mail, and shields. Their religion appears to be a worship of nature, and of their ancestors. The island is nominally subject to the Netherlands, but is virtually independent. Excellent horses are exported, the chief port being Nangamesa.

SANDARACH, a gum resin produced by *Callitris quadrivalvis*, a coniferous tree, called in Barbary the *amar tree*. The gum is also named *juniper resin*, or *gum juniper*. It is imported from Mogadore, and is employed in the preparation of varnishes. When powdered it is called *pounce*, which was used before the invention of blotting paper. The wood of the tree is chosen by the Turks for the ceilings and floors of their mosques.

SANDBACH, a market town of Cheshire, England, 24 miles east by south of Chester, on an eminence at the foot of which flows a streamlet called the Wharfedale. It is amply supplied with water of excellent quality, and is lighted with gas. The houses are mostly of red brick, and well built, and in the market place there are two antique obelisks. Sandbach possesses a handsome church, in the perpendicular style, and several other places of worship, a spacious grammar school, in the early English style, and several charities, including an extensive one called the Burslem Charity. Boots and shoes are manufactured here to a considerable extent, though much more limited now than formerly. There are also a foundry, wire works, fustian factories, &c., and salt works at a short distance from the town. Pop (1891), 5824, (1901), 5556.

SANDBAGS, in military operations, are coarse canvas bags, about 30 inches long and 15 inches thick, filled with sand, and much used in cases where cover for troops is required to be speedily obtained as a temporary revetment for parapets, &c. Layers of sandbags are often laid on the crest of the parapet, in manner of bricks, with loopholes for small arms.

SAND CRAB, or **RACING CRAB** (*Oecypode cursor*), a peculiar genus of Crustacea, included in the order Decapoda, and found in Ceylon and elsewhere. These crabs burrow in the soil, and frequently excavate holes of considerable extent. They are included among the 'Land crabs,' and by the disposition of their breathing apparatus, are adapted for living for considerable periods out of the water. Their name of 'Racing Crabs' has been derived from the surprising swiftness with which they manage to run. They seek the sea coast at the breeding period. Their flesh, although eaten, is by some considered to be of injurious nature, but this latter opinion may probably be modified, since, like the Mussels and other shellfish, the flesh of these crabs may vary in its wholesomeness with the food upon which the animals subsist.

SAND-EEL (*Ammodytes Tobiensis*), a genus of Teleostean fishes belonging to the sub order Anacanthini, and forming the type of the family Ammodytidae. The Sand eels are distinguished from the ordinary eels by the fact that the tail fin in the former is well developed, and is distinct from the dorsal and anal fins, whilst it is also forked at its extremity. The skin is silvery in appearance, but destitute of true scales. The dorsal fin begins just behind the head, and extends nearly to the caudal

or tail fin. The anal fin, on the lower surface of the body, extends to about one-third or one half the length of the body. Both dorsal and anal fins are supported upon fin-rays, which are wholly soft in their nature. The Sand eels bury themselves in the sand of the sea coasts, from which they are dug out to serve as bait for the deep sea fishermen. The average length is from 11 to 13 inches. The Sand-lance or Sand lance (*A. lancea*) is a smaller species of the genus Ammodytes, measuring on an average about 6 inches in length. These two species are sometimes collectively termed either Sand eels or Sand lances, and are both common around the British coasts. The Sand lance scoops out its way beneath the sand with marvellous celerity, using its sharp under jaw as the boring organ. It is known sometimes locally by the name of the Wriggle, whilst the larger Sand eel is also popularly named the Hornels in some districts.

SANDEMAN, ROBERT, in whom the sect called *Sandemanians* originated, was born at Perth, in Scotland, in 1723. He studied at Edinburgh, and afterwards engaged in the linen trade. On marrying the daughter of the Rev John Glass (founder of the Glasites) he became an elder in his congregation, and soon after published a series of letters, in which he endeavours to show that a justifying faith means nothing more than a simple assent to the divine mission of Christ. Sandeman went to London in 1760 and managed to gather together a congregation of his own followers, who were called *Sandemanians*. The Glasites or Sandemanians still form a small religious body, chiefly in Scotland. The chief opinions and practices in which this sect differs from others are their weekly administration of the Lord's Supper, weekly love feasts, &c. (See GLASITES). In 1764 Mr Sandeman accepted an invitation to New England, where he died in 1771. He was author of some theological tracts, letters, discourses, &c., besides his letters on Theism and Aspasio.

SANDER (*Lucioperca sandra*), a species of Teleostean fishes belonging to the family of the Percidae or Perches, and found in fresh-water rivers and streams in Germany and the east of Europe generally. It attains an average length of from 3 to 4 feet, and resembles the Common Perch in general form, save that it is more elongated. The flesh is highly esteemed as an article of food. The name 'Giant Perch' is sometimes applied to the Sander, whilst the term 'Pike Perch' has been given to it, in allusion to the resemblance it presents in outward appearance to the form of the familiar Pike. The teeth are of large size. This fish is coloured of a greenish olive, marked with brown bands on the upper parts, and white below.

SANDERLING (*Calidris*), a genus of Grallatorial or Wading Birds, variously allied in the opinions of ornithologists to the Snipes and Plovers. Of these birds the familiar species is the Common Sanderling (*Calidris arenaria*), a bird averaging from 6 to 8 inches in length, and coloured in winter of a gray on the upper, and of a white on the under parts. The spring plumage differs from the winter plumage in the possession of reddish tints, marked with black. This bird occurs in the Arctic regions and breeds there. In winter it migrates southwards, and is then found in Britain, North Africa, India, and South America. The food consists of worms, Crustacea, &c., these birds chiefly inhabiting the sandy tracts of the sea beach, and the estuaries of rivers. The flesh is nutritious and pleasant to the taste, the Sanderlings being sold regularly in the markets of London and other cities.

SAND-FLIES (*Simulium*), a genus of Dipterous Insects or Flies, the bite of which may give rise to

painful swellings. These flies are included in the sub order Nemocera, and in the family of the Tipulidæ, which also includes the well known Tipulæ, Daddy Long legs', or Crane flies.

SAND-GROUSE (*Pterocles*), a genus of Rasorial or Scratching Birds, belonging to the family Pteroclidæ, and differing in several respects from the Common Grouse (which see), belonging to the family Tetraonidæ. The Sand grouse inhabit the plains and sandy deserts of the tropical regions and countries of the eastern hemisphere. The Asiatic tablelands thus afford typical places for their habitations. The legs are longer than in other grouse, and the tail and wings are pointed. The best known species of this family are the *Pterocles alchata* and the *P. arenaria*. Both of these birds occur in Southern Europe. They fly well, and feed upon seeds and insects. The eggs are four or five in number, and the nest is constructed in a rough fashion on the ground. Pallas's Sand grouse has been made the type of a different genus, *Syrnhyphantes*, in which the tarsi are feathered and the toes united. It is a native of the plains of Central Asia, where it occurs in vast numbers. Much interest was excited in 1863 and again in 1883 by vast numbers of these birds invading Europe. They crossed the North Sea and were found in considerable numbers throughout Britain and as far north as the Faroes. They even bred in Britain in one or two cases. See illustration at the article ORNITHOLOGY (Pl. IV).

SAND HOPPER (*Talitrus locusta*), a species of Crustacea, included in the order Amphipoda of that class. This animal is a familiar denizen of our sandy coasts, and may be met with leaping about the sand in great quantities after the receding tide. The Sand hoppers in some systems of Crustacean classification are included in the family Orchestridæ or Jumpers, a name given to them in allusion to their habits of leaping. When placed in water these forms swim on their side. The Sand hoppers, like all other Amphipodous Crustaceans, possess breathing organs in the form of membranous structures attached to the bases of the limbs of the thorax or chest, of which seven pairs exist. These limbs are directed partly forwards and partly backwards and from this latter circumstance the name Amphipoda is derived. The three hinder pairs of limbs attached to the abdomen, which consists of seven segments, are turned backwards, and along with the telson or terminal segments form a tail adapted for leaping or swimming. These forms undergo little or no metamorphosis after leaving the egg and are frequently hatched with their full complement of segments and limbs. The heart exists as a tubular organ, contained within the six segments succeeding the head. The food consists of animal and vegetable matter in a state of decay, and these small Crustaceans in turn form a large proportion of the food of larger animals, and especially of aquatic birds. A species of beetle (*Uellenum laterale*) is also an enemy.

SANDHURST, a village in England, Berkshire, about 5 miles south by east of Wokingham. It is pleasantly situated, and is famous for its Royal Military College, which is a simple but majestic structure, with a fine Doric portico, situated in the midst of extensive and picturesque grounds. The college was originally founded in 1802, at Great Marlow in Bucks, but was removed to Sandhurst in 1812. The purpose for which it was founded was to give a complete general as well as military education to the cadets who attended. Formerly these were admitted from the age of thirteen upwards, but in 1862 a change was made, the course was limited to one year prior to entering the army, and the instruction confined to higher mathematics, modern languages, and military

instruction. With the abolition of purchase in 1871, however, another change passed over the college, which was followed by yet another change in 1877. The entrants are now cadets between the ages of seventeen and nineteen who have passed by competition for the army. The course extends over 1½ year, divided into three terms, and comprises the following subjects: army administration, military law and jurisdiction, military history and geography, fortification, surveying, infantry drill, riding, and gymnastics. There is an examination at the end of each term. At the end of the course the cadets enter the infantry or cavalry with the rank of second lieutenant.

SANDHURST Australia. See BRANDIGO.

SANDIVER the gum drawn from molten glass when in process of manufacture. It is used, when pulverized as a polishing substance.

SAND LANCE, or **LAUNCE**. See SAND EEL.

SAND LIZARD (*Lacerta agilis*), the larger of the two British species of true lizards. It usually measures from 8 to 10 inches in length, has a short, thick head, and a tail not much longer than the length of the head and body. The male is usually greenish and the female grayish in colour, both being also marked by spots. This species is found farther north than the Common Lizard (*L. vivipara*), its favourite habitat being sandy heaths. It is oviparous, not ovo viviparous like the commoner species.

SAND MARTIN, or **BANK MARTIN** (*Hirundo or Cotile riparia*), a species of Insectivorous Bird, included in the family Hirundinidæ or Swallows. The Sand-martin is the smallest British member of its family, and is so named from its habit of nest building in the banks of rivers, in sand or gravel pits, and in similar situations. A gallery or tunnel, often 2 feet or more in depth, leads to the nest itself, and the eggs, of white colour, are laid upon a bed of feathers and hay. The galleries are generally of circular and winding conformation. The Sand martin occurs in North America also. The bill, forming the organ with which the work of excavating the nest is carried on, is broad at the base, and tapers suddenly to its point. These birds appear to arrive in Britain in their northward or spring flight at an earlier date than their allies the Swallows and House martins. The colour of the Sand martin is a soft brown on the head and upper parts, the quill feathers of the wings and tail being of black hue. The under surface is of white colour, and a band of brown runs across the upper part of the chest. The eyes are of a hazel colour, and the beak is dark brown.

SAN DOMINGO. See HAYTI.

SAN DOMINGO (more properly **SANTO DOMINGO**), the capital city of the Dominican Republic, which includes the eastern part of the island of Hayti, picturesquely situated on the south coast, at the mouth of the navigable Ozama in the Caribbean Sea. It is nearly in the form of a trapezoid, extending about ½ mile east to west, with nearly the same maximum breadth, and is surrounded by walls flanked with bastions. It is built with great regularity, consisting of spacious, but mostly unpaved streets, which intersect each other nearly at right angles, and are lined by houses, the greater number of which are of stone, and the remainder of wood. The houses have generally only one story, flat roofs, and barred windows with projecting lattices. Some of the houses built by the early settlers, in the Moorish style, are still standing. The most conspicuous public building is the cathedral, commenced in 1514, during the governorship of Don Diego, the son of Columbus, and finished in 1540, it is a large and handsome Gothic structure, with a lofty roof, supported by fourteen massive

columns, and has a richly ornamented high altar. The ashes of Columbus and his brother Bartholomew reposed in it for nearly two centuries and a half, but on the cession of the island to France were removed to Havana. Besides the cathedral there are fourteen other churches and chapels, one of the latter belonging to the Wesleyans. The convents, of which there were several, are now in ruins. The largest and most celebrated, that of San Francisco, during its greatest splendour, contained 300 monks, its extensive ruins form one of the most striking features of the city when approached from the sea. The other principal buildings are the national palace, where the Spanish governor used to reside, and immediately adjoining it the ruins of Don Diego's palace, the handsome modern building where the sittings of the national congress are held, the town house or *cabildo*, an ancient stone structure, with Moorish arches, and an old carved ceiling in its principal hall, the Jesuits' college, now a ruin, a new college, indifferently attended, a citadel with extensive barracks, a well kept arsenal, an ordinary and a leper's hospital. Santo Domingo was founded 1496, by Bartholomew, the brother of Columbus, on the east or left bank of the Ozama, and here it was that Bobadilla imprisoned Columbus. In consequence of a great hurricane which laid the town in ruins in 1502 it was transferred to its present site on the right bank, and advanced so rapidly that its historiographer, Oviedo, in describing it to Charles V. in 1528, declares it equal to any city of Spain in respect of the beauty of its situation, the regularity of streets, and the magnificence of its buildings. The first blow to its prosperity was struck in 1586 by Sir Francis Drake, who took it by assault, pillaged, and nearly destroyed it. The earthquakes of 1684 and 1691 ruined most of the magnificent buildings which Drake had spared. Pop. estimated at 16,000.

SAND PAPER is made in the same way as emery paper, with the difference that sand is substituted for emery. See EMEY.

SAND PIPER (*Tringa*), a group of Gallatorial or Wading Birds, belonging to the family Scolopacidae or Snipes, but included in the sub-families Tringinae or Totaninae, the members of which differ from the Snipes chiefly in the length of their limbs. The bill is elongated, slender, and grooved, and may be curved upwards or downwards. The hinder toe is small, and elevated on the back of the tarsus, or may be wanting, the front toes being generally united at their bases by a web. These birds inhabit the shores of the sea and the estuaries and banks of rivers, and grope in the soft mud for the worms, small molluscs, insects, &c., upon which they feed. The nostrils are linear, and situated within a groove on the bill. The tongue is slender and pointed. The legs are not feathered further down than the knee. The nests are built in the grass, the young being able to follow the parents and to seek food for themselves immediately after birth. They migrate southwards in winter in flocks, and appear to moult twice a year, the summer plumage differing from the winter dress. The voice is shrill and unmusical, and they are able both to run and to fly with rapidity. The first quill is the longest in the wings.

Of the Sand pipers the common species (*Tringoides* or *Tringa hypoleucos*) is a familiar example. It is sometimes named the Summer Snipe, from its arriving in England in April or May and leaving it in October. The head, back of the neck, back, upper tail coverts, and centre of the tail, are coloured greenish-brown, these parts being also mottled with black. A dark stripe runs from the base of the bill to the eye, and a strip of light colour passes over the eye. The tail exhibits greenish-black markings, whilst the

plumage generally is marked with white, this latter colour being also seen on the chin and under surface of the body. The Green Sand-piper (*T. ochropus*) is coloured brownish green, with brown markings. The eyebrow is white, as also are the chin, breast, belly, and side of the neck, the latter parts being streaked with grayish lines. The primary feathers are black. The length of this species is about 10 inches, and that of the Common Sand piper about 7 or 8. Other species are the Wood Sand piper, Spotted Sand-piper, and Buff breasted species.

The preceding species by some ornithologists are included in the genus *Tringoides*, as distinct from the genus *Tringa*, in which the Curlew Sand piper (*Tringa subarquata*), Temminck's Stint (*T. Temminckii*), the Dunlin or Sea snipe (see DUNLIN) (*T. cinclus*), and the Knot (*T. Canutus*), are included. The first mentioned of these latter birds is a summer visitor to Britain, the male in summer being coloured of a rich chestnut, streaked with black, whilst the head and neck are streaked with black and white. The back is coloured black and chestnut intermixed, whilst the wings are blackish, with white shafts. In winter this bird possesses a plumage more generally of ashy brown hue. Its length is about 8 inches. The eggs are yellowish white in colour, spotted with dark brown. Temminck's Stint is the smallest of the British native Sand pipers, in length about 5½ inches. It inhabits the coast, and breeds in Northern Europe. The head is coloured black and rusty red, the back is of blackish tint, mottled with grayish white, and the wings are blackish brown edged with white. The under parts are white, and the breast is lightish yellow streaked with white. The Knot—so named after Canute, the word being a corruption of that king's name—is found in large flocks on the British coasts, and feeds chiefly on sea-grass. It does not usually breed in Britain. The eggs are five in number, and the nest is represented merely by a tuft of grass. The summer plumage shows a chestnut head, with deeper chestnut, streaked with brown, on its top. The under parts are coloured of a warm chestnut, fading into white towards the tail, whilst the back is mottled with chestnut, black, and white. The average length of this bird is about 10 inches. Its winter plumage is ashy-gray, with black wings and white under surface.

SAND SCREW (*Sulcator arenarius*), a species of Crustacea, nearly allied to the Sand hoppers (which see), and so named from the tortuous manner in which it excavates its burrows in the sand. It is included in the family Gammaridae, or that to which the Fresh water Shrimp (*Gammarus pulex*) belongs. In the genus *Sulcator* the second and third pairs of legs are provided with two claws, the antennae or feelers terminate in lash-like points, and the upper antennae are only half the length of the lower pair. Kroyer's Sand screw (*Kroyera arenaria*) is an allied species, but is of more slender conformation than the common form.

SAND STAR (*Ophiura*), a genus of Star fishes or Echinodermata belonging to the order Ophiuroidea, and distinguished from the Common Star fishes or Asteroideans. In the Sand stars the arms or rays are mere appendages to the body, and not definite parts of it, as in the ordinary Star fishes, and the viscera or organs of the body do not extend into the rays, as in the latter forms, but are confined to the central body piece or 'disc'. The ambulacral system of vessels is not well developed, and does not subserve locomotion, at least to the same extent as in the Asteroidea. The Common Sand star (*Ophiura texturata*) is a familiar form, occurring in great quantities around the British coasts, and in some localities is obtained in immense numbers by means of the dredge. The

White Sand-star (*O. albidus*) is another familiar species.

SANDSTONES consist usually of grains of quartz aggregated into a compact rock, which may also contain particles of felspar, minute scales of mica, and an admixture of clay, indicating in many cases their immediate derivation from the debris of granitic rocks. Sandstones differ much in colour and texture. When iron is an ingredient it imparts to the substance various shades of red and yellow, of which there are examples in the 'Old Red' or Devonian system of rocks underlying the coal formation, although many of the rocks of the system are not red, but gray, and also in the 'New Red' or Permian and Triassic systems, succeeding the coal, but as sandstones may be found in any geological system, so any sandstones may be red or yellow. Some sandstones are very compact and hard, while others can be broken to fragments between the fingers. When the sandstone is hard and harsh, and contains a mixture of silicious pebbles, it receives the name of grit, or millstone grit. Conglomerate is a description of sandstone consisting of rounded pebbles cemented together, and known by the common name of 'pudding stone'. When the pebbles are angular the rock is called 'breccia'. When sandstone consists almost wholly of small particles of quartz, assuming a saccharoid texture, it is quartzite. Many sandstones show distinctly the layers of successive deposits, sometimes exhibiting as many as twenty laminae in 1 inch of thickness, and these rocks are described as laminated, others, such as the sandstones used in paving, and which split up in thicker layers, are termed flags and flag stones, while a third kind has a fissile or slaty structure, arising from the deposition of scales of mica alternately with the sandy laminae. As a building material the more silicious the sandstone the better will it resist the corroding influences of the atmosphere and the climate, and at the same time preserve its light colour. On the other hand, sandstone containing much diffused iron soon becomes blackened, and scales off by oxidation. When the stone is porous and absorbent it is liable to suffer from the disintegrating effect of frost.

SANDUSKY, a city of Ohio, in the United States, capital of Erie county, on Lake Erie, at the mouth of the Sandusky river, about 110 miles north of Columbus. The town, built on ground rising gradually from the water, commands beautiful views of the scenery of the lake, and is laid out with great regularity in spacious streets. The principal public edifices are the government building, court house, many churches, a high school, public library, a custom house, the county infirmary, soldiers' and sailors' home, &c. Its most important industrial establishments are extensive machine shops, chiefly for the manufacture of iron articles connected with railways, there are also manufactures of cutlery and edge tools, wine and beer, turned and carved wood, &c. Shipbuilding is also carried on. Its trade is very extensive, and it has one of the best land-locked harbours on the great lakes. Its fresh fish industry is very important, and its export of wine, grapes, and peaches is very large. Pop (1880), 15,838, (1890), 18,471.

SANDWICH, a municipal and formerly a parliamentary borough (with two members), and one of the Cinque Ports of England, in the county of Kent, on the right bank of the Stour, about 3 miles from its influx into the sea at Pegwell Bay, 65 miles E.S.E. of London, and on the South Eastern Railway. The streets are narrow, and the houses, many of which are ancient, are irregularly built. The ancient walls have been levelled to form a fine

promenade. It has an ancient guild hall, three ancient parish churches, one of them being a most interesting specimen of early Norman architecture, and a free grammar school. The place has a considerable trade, and carries on brewing, malting, tanning, and shipbuilding. The harbour, long neglected, has been improved, and now admits vessels drawing 10 feet. Agricultural produce is exported, and timber, iron, stone, &c., imported. The parliamentary borough, which included Deal and Walmer, was disfranchised in 1855. Pop (1881), 2846, (1891), 2796, (1901), 3174.

SANDWICH, the name given to an article of food consisting of a slice of meat, fish fowl, or other savoury food placed between two slices of bread, which may be plain or buttered. They are said to be so named from the fourth Earl of Sandwich, who used to have them brought to him at the gaming-table to enable him to go on playing without intermission.

SANDWICH, EDWARD MONTAGU, first EARL OF, English admiral, was born on July 27, 1625. While quite a youth he fought on the side of the parliament at Marston Moor, Naseby, and elsewhere, and in 1653 he became a member of the council of state. In 1656 he was appointed conjoint general at sea with Blake. He openly went over to the side of the exiled Charles in 1660, and assisted in the restoration of the monarchy, being created Earl of Sandwich for his services. In 1664 he was appointed rear admiral of the fleet and admiral of the blue squadron, and in the following year he took part in the English naval victory over the Dutch off Lowestoft. He went to Madrid as ambassador in 1666, and on the outbreak of war with Holland in 1672 he became second in command of the fleet as admiral of the blue. On the 28th of May in that year he lost his life in the naval action of Solebay.

SANDWICH ISLANDS, or HAWAII, a cluster of islands, thirteen in number, situated in the North Pacific, between lat. 18° 55' and 22° 20' N., and lon. 154° 50' and 160° 40' W., extending in a curve from north-west to south-east. Five of them are mere islets, all the other eight (Hawaii, Maui, Oahu, Kauai, Niihau, Molokai, Lanai, Kahoolawe) are inhabited, but only four are of considerable size. The total area is 6640 square miles. They are all high, steep, and mountainous, with many lofty summits, which are entirely of volcanic origin, but not being protected by barrier reefs, except in one instance, are almost destitute of good harbours. Hawaii or Owhyhee, the most easterly and largest of the islands, is particularly elevated on its western coasts. These, overhanging a narrow, arid beach, rise into steep, bleak, volcanic mountain slopes, which only in their upper parts become watered and wooded, and afford cultivated ground to maintain a considerable population, on the other coasts the slopes are less rapid, the shores spread out into wider plains, and the valleys opening from them contain much fertile soil. The interior of the island forms a plateau from 3000 feet to 4000 feet high, and is almost entirely covered by thick forests, partly roamed over by herds of wild cattle. Above the plateau rise three volcanic peaks, still active, the loftiest (Mauna Kea) 13,800 feet high. Of Mauna Loa, one of these peaks, a great eruption took place in 1852, when a column of molten lava was projected into the air a height of 500 feet. In 1859 another terrific eruption occurred, and again, in 1868, after a series of most calamitous earthquakes, Mauna Loa burst and vomited forth deep streams of lava, which pushed far out to sea and threw up a large island. A subsequent eruption,

in 1880-81, lasted for nine months. The second island, Maui, north west of Hawaii, is no less mountainous, and consists of two peninsulas connected by a flat isthmus, the one on the west with hills of only moderate height, and a fertile soil, while the other runs to the height of 10,000 feet. Oahu, the third large island, has in its northern part two summits rising to between 3000 and 4000 feet, but the whole of the southern part consists of a large and fertile plain, forming the best cultivated and most populous district of the whole group. On its southern shore a wide barrier reef contributes to form the excellent harbour of Honolulu. Kauai, the fourth large island, resembles Hawaii in its formation, and has an elevated plateau, with mountains rising from it to the height of 7000 feet. The climate is very healthful, but leprosy is common. The lepers are isolated in the island of Molokai, which was the scene of Father Damien's life of self sacrifice. The avifauna of the islands is very interesting.

The original inhabitants of the group, or Kanaakas, belong to the light coloured Oceanic stock, and bear a very close resemblance to the other islanders of the Pacific, particularly the Tahitians, in bodily appearance as well as in customs and modes of life, though in none of the other groups has civilization made so decided progress and produced more abundant fruits. The natives at Hawaii from the first manifested a decided inclination to live on friendly terms with Europeans and a peculiar aptitude for understanding and adopting European manners and arts. They also gave a welcome reception to the Protestant missionaries sent among them, and voluntarily exchanged heathenism for Christianity. In 1837 difficulties arose about some Roman Catholic missionaries who were expelled by the natives, France interfered, and after some years of disputing a treaty was negotiated securing equal rights to Roman Catholics, who now have their churches and a bishop. In 1861 an English clergyman was consecrated Bishop of Honolulu. There are some two hundred schools in the islands, attended by about 15,000 pupils, many of whom are natives or half castes. The teachers are mostly Americans, but many of them are Hawaiians. The chief productions are sugar and rice, but coffee, indigo, bananas, and wool are also important exports. The total imports of the Sandwich Islands amounted in 1899 to £3,801,800, the native exports to £4,525,600. Three fourths of the imports are from the United States, and over ninety nine per cent of the exports go to that country. There is steam communication with America, Australasia, and China. About 100 miles of railway have been opened in Hawaii, Maui, and Oahu, and telegraphic communication is being extended. The revenue and expenditure each amount to about £500,000, the former being slightly in excess. There is a debt of £400,000. Pop (1896), 109,020, including 31,019 natives, 8485 half castes, 21,616 Chinese, 24,407 Japanese, besides Portuguese, Americans, British, Germans, &c., (1900), 154,001.

The Hawaiian islands were discovered in 1542 by the Spaniard Gaetano. In 1778 Captain Cook visited them, and in the following year he was killed in a quarrel with the natives on the island of Hawaii. The first king of the whole group was Kamehameha I, who died in 1819. The progress of civilization was chiefly due to King Kamehameha III, who died in 1854, after a reign of thirty years. He was succeeded by his nephew, Kamehameha IV, who died in 1863, and was succeeded by his brother Kamehameha V. The new king being dissatisfied with the previous constitution of his coun-

try, as being too democratic, introduced changes in 1864. Kamehameha V died without issue in 1872, whereupon the legislature elected Lunalilo, a leading chief, to succeed him. On his death (1874) King Kalakaua I was elected. Kalakaua died in January, 1891, whereupon his sister Liliuokalani succeeded as queen, but in 1893 she was dethroned, and a republic established, with a president and a legislature of two houses. In 1898 the islands were formally annexed to the United States, and they now form a territory of the Union.

SAND WORMS, a name applied to many members of the two Branchiate ('gilled') orders of Annelida or Worms, since various species of these forms inhabit the sand of the sea coasts to a greater or less extent. Many genera, such as the *Arnicolæ* or Lob worms, the *Nereidæ*, and other forms belonging to the order Errantia, spend their entire existence amid the sand, to the surface of which they come up when the tide is at its full, and burrow downwards into the depths at its ebb. Many Tubicolæ or Tube dwelling Worms, such as *Sabella* (which see), *Sabellaria*, *Terebella*, and others, manufacture tubes of sand or of similar materials, which are imbedded in the sandy coasts, the gills and head segments of the worms appearing above the surface, and other genera of worms, less popular and less widely known and recognized, have their habitat in the loose sand, especially near low water mark.

SANDWORT (*Arnica*), a genus of plants belonging to the natural order Caryophyllaceæ, comprising low herbs with usually awl shaped leaves and small white flowers. Several species are found in Britain chiefly on sandy shores.

SANDY HOOK, a low, sandy peninsula of Monmouth county, New Jersey in the United States, projecting northwards for 6 miles, and separating Sandy Hook Bay from the open ocean, 20 miles south of New York. At its northern extremity there is a beacon light, and near that a lighthouse 90 feet high. There are also batteries and fortifications.

SAN FERNANDO, formerly *ISLA DE LEON*, a town of Spain, 7 miles south east of Cadiz, situated on a flat in the *Isla de Leon*. It is fortified, but is in general very indifferently built. Among the more prominent institutions are naval workshops and establishments, a naval academy, an extensive arsenal, an excellently equipped observatory, an iron foundry, &c. It has a considerable trade in salt. Pop (1887), 29,287.

SAN FRANCISCO, a city of California, United States, on the north east corner of a peninsula which lies between the bay of San Francisco, a fine landlocked expanse of water, and the Pacific Ocean. It stands on the east slope of some high hills, facing the bay, on a bleak tract, with no trees, and little fertile ground within a distance of 20 miles, and is built chiefly in an amphitheatre formed by Telegraph Hill (294 feet high) on the north east, Russian Hill (120 feet) on the south east, and Russian Hill (360 feet) on the west. The streets are straight, and intersect each other at right angles. There are a public park of 1050 acres, a pleasure garden, and eleven squares. Much has been done in levelling and improving the site. The busiest streets have a pavement of cobble stones or cubical blocks of stone, but the others, both in the carriage way and on the side paths, are laid with planks. Water is brought by an aqueduct from a distance of 20 miles. Among the principal public buildings are the custom house, the city hall, built in 1894 at a cost of over £1,000,000, of brick faced with stucco, the mint, the marine hospital, the merchants' exchange, the California bank, the Nevada bank, the safe deposit build-

ing, several theatres, numerous churches, schools and charitable institutions, the Pioneer hall, a convent, two orphan asylums, &c. Among the most notable buildings of the city are its huge hotels, one of which, the Palace Hotel, has accommodation for 1200 guests, while another, the Baldwin Hotel, can accommodate 600. The educational institutions include an academy of sciences, an art institute, a mechanics' institution, three literary colleges, a medical college, a new college of commerce affiliated to the University of California, a school of the mechanic arts, a new Pacific commercial museum, &c. The largest public library is the mercantile library, with about 50,000 volumes. The population being largely composed of foreigners, there are newspapers not only in English, but in French, German, Spanish, Italian, and other languages. Cable tramways have been constructed through most of the streets, which have extensive traffic. Among the industrial establishments of the city are cigar manufactories, boot, shoe, and slipper works, carriage and wagon works, tanneries, marble works, furniture works, breweries, soap works, foundries and machine shops, sugar refineries, flour mills, woolen mills, chemical works, fruit preserving works, glove manufactories, &c. San Francisco is one of the finest and most attractive cities of America, and is continually improving. The houses are chiefly built of wood (earthquakes being rather common), and often display much external decoration. The commercial importance of the city is very great, it being the principal mercantile centre west of the Rocky Mountains, and being directly connected by railway with the Eastern States. It has one of the finest harbours on the Pacific coast. The entrance from the Pacific is through the Golden Gate, a waterway about 3 miles wide. San Francisco Bay communicates northwards by a similar channel with San Pablo Bay, and the latter eastwards with Suisun Bay. The export of coin and bullion was, in 1888, £2,980,000, in 1899, £2,132,046, in 1900, £3,123,954. No record is kept of the value of the goods exported by rail. The imports by sea consist chiefly of raw silk, coal, sugar, coffee, and tea, and the value of these and all other imports (except treasure) in 1900 was £8,128,749. The value of the silk alone was £2,037,076, of the coal, £1,406,134, of the sugar, £1,305,596. During the same year the exports were valued at £7,949,012, the chief of which were wheat and flour, tinned salmon, tinned fruit, wine, barley, timber, and the number of vessels that entered the port in 1900 was 937, of 1,468,501 tons, cleared, 895, of 1,403,860 tons. The British tonnage entered was 530,974. The shipping is chiefly engaged in trading with foreign countries, including Great Britain, Australia, China and Japan, and South America. San Francisco, previously known as Yerba Buena, assumed its present name in 1847, the population being only 500. In the spring of 1848 gold was discovered, and a rush took place, which had raised the population in 1852 to 34,870. In 1860 the population was 55,626, in 1870, 149,473, in 1880, 233,959, in 1890, 298,997, in 1900, 342,782. The city contains a large number of Chinese, who live in a part of the city known as Chinatown.

SANGALLO, ANTONIO, an eminent Italian architect of the sixteenth century, was born in 1485 in the environs of Florence. Visiting Rome, where he had two uncles who were architects, he was instructed by them in their art, his knowledge of which he perfected under Bramante, whom he succeeded as architect of the church of St Peter. He was much employed under the popes Leo X., Clement VII., and Paul III., both in fortifying places and in the construction of public buildings, the

grandeur and solidity of which have been much admired. He died in 1546 at Terni.

SANGERHAUSEN, a town of Prussian Saxony, in the government and 33 miles WNW of Merseburg, on the Gonna. It contains two castles, four churches, including one of the finest basilicas in Germany, restored in 1893, a gymnasium, hospitals, and several courts and offices. There is an iron-foundry and machine work, agricultural machinery is made, and other industries are concerned with malt, brewing, beet-sugar, brick making, &c. Pop. (1895), 11,414.

SANGIR ISLANDS, a group of islands in the Malay Archipelago, so called from the name of the largest island, which is nearly equidistant from the north-east extremity of Celebes and the south extremity of the Philippine island Mindanao. The group consists of three larger and a great number of smaller islands, most of them inhabited, and covered with whole forests of cocoa palms. The islands are generally mountainous, and betray their volcanic origin not only by their geological formation, but also by actual display of volcanic agency. On Great Sangir, the largest and most northerly of the islands, the volcano of Aboe, which rises to the height of 4000 feet above the sea, burst forth in 1812, and emitted streams of lava which poured down on all sides, destroyed many human beings, and converted the northern part of the island, previously covered with thriving plantations and well cultivated fields, into a desert waste. After nearly half a century of quiescence it burst out anew in 1856, and repeated its former devastation, the number of lives that were lost being 6000. In 1892 another great eruption took place, also causing immense damage to crops and great loss of life. The principal articles of culture and trade are rice, pisang, sugo, and coconut oil, the last being the great staple. Two of the smaller islands abound in swallows' edible nests, which yield no small revenue. The natives belong to the Malay race. They embraced Mohammedanism in the latter part of the fifteenth century, but were afterwards converted to Christianity by the Portuguese. The islands now form a dependency of the Netherlands, and a number of schools and churches have been erected by missionary and native effort. Pop. 50,000.

SANGRAAL. See GRAAL.

SANHEDRIN, or SANHEDRIM (corrupted from the Greek *synedrion*, a council), the supreme judicial tribunal of the Jews, existing in the time of the Maccabees and in New Testament times. According to rabbinical tradition the institution of the sanhedrin is to be traced to the time of Moses and the events mentioned in Num. xi 16, 17, but this view is now generally rejected, and the time of its institution referred to a much later date. The most probable opinion is that it consisted of seventy-one members, including the president. From incidental notices in the New Testament we learn that the members were drawn from three different classes: 'the chief priests', consisting partly of those who had previously filled the office of high priest, and partly of the heads of the twenty-four classes into which the priests were divided, 'the elders of the people', that is, the heads of tribes and family associations, and 'the scribes', or those learned in the law. At its head was a president, who bore the honourable title of *nasi* or prince. The jurisdiction of the sanhedrin, as the supreme tribunal of the Jews in civil as in ecclesiastical matters, was very extensive. It was the final court of appeal from all inferior courts, and, in addition to this, it alone had the right of judging in matters affecting a whole tribe, of determining questions of peace or war, of

trying the high priest or a disobedient member of its own body. It pronounced also upon the claims of prophets and upon charges of blasphemy. Its jurisdiction was not confined to Palestine, but extended to every place where the Jews had settlements (Acts ix 2). According to the Jerusalem Gemara the power of inflicting capital punishment was taken away from this tribunal forty years before the destruction of Jerusalem, and this accords with the answer of the Jews to Pilate (John xix 37), 'It is not lawful for us to put any man to death.' It might indeed pass sentence of death, but it required the confirmation of the Roman procurator before such sentence could be executed. The forms of procedure in the court seem to have been characterized by a general spirit of fairness. Different kinds of evidence were carefully weighed, and the agreement of at least two witnesses was necessary to procure a sentence of condemnation. The sessions of the sanhedrin were at first held in one of the buildings connected with the temple, but the place of meeting was afterwards removed to a portion of the court of the Gentiles, and after several other changes its seat was finally established at Tiberias. Besides the high council, there were also inferior courts or lesser sanhedrins in the country towns, composed of persons of the same classes. After the destruction of Jerusalem by the Romans these courts were annihilated with the Jewish state.

SANITARY SCIENCE concerns itself with the application of the laws of healthy living to the prevention of disease. Hence the alternative definition *preventive medicine*, which, because its object is the general prevention of disease over large areas or among large bodies of people, is also known as *public or state medicine* and *public hygiene*. Sanitary science may be said to be of almost modern growth, although there is sufficient evidence that the older civilizations well understood the primary necessity of an ample water supply, and readers of Layard's work *Nineveh* and its Remains need not be reminded that the advantages of a carefully planned system of drainage were already well understood by its inhabitants, and that 'pipe drains of baked clay' connected almost every chamber in the older palace of Nimrud with a 'square built main channel', which formed the main affluent of the system. One of the earliest treatises on modern preventive medicine, by Dr Richard Mead, entitled, *A Short Discourse concerning Pestilential Contagion, and the Methods to be used to Prevent it*, coincided in date with the appearance of the plague in Marseilles in 1720, and Mead's work is worthy of mention, if only for the illustration which it affords of the direction which modern sanitation first and most naturally took. It was directed to the control of a disease which spread by infection, and this still claims a chief place in the work of preventive medicine. But a more intimate knowledge of the conditions which favour the spread of infection opened a wide field of enquiry into the causes of diseases which are not infectious, but are preventable in so far as they depend on surrounding conditions which are removable. For in a large measure it is true that the spread of infection is but a limited and accidental illustration of the operation of circumstances whose general tendency is to produce ill health in persons continuously exposed to them.

Infectious or zymotic diseases, as they are called (from Greek *zymosis*, fermentation), have thus long ceased to represent more than a section of all that sanitation aims at, and diseases of any kind, if caused by conditions external to the individual, are properly subjects with which it may deal. In other words, the prevention of disease, by removing its

causes when possible, and combating their effects when they are not removable—as distinguished from its treatment—is the aim of preventive medicine. It claims assistance from medicine and bacteriology regarding disease processes, from meteorology it obtains information on the influence of sunshin, heat, and moisture on biological processes, from geology regarding the nature of the soil and its influence on health, from engineering in relation to questions of water supply and drainage, from architecture as affecting the internal economy of dwellings, and from vital statistics as affording a means of measuring the influence of all these combined on the individual life.

It is customary to say that in pure air, pure water, and unadulterated food are contained both the aim and the realization of the work of sanitary science, but more closely looked at the question is, How are those to be obtained? For while individual hygiene is the luxury of him who may choose to live as he pleases, public hygiene is the necessity of populations who must live as they can, quite irrespective of whether the conditions are favourable to health or otherwise. As is well known, certain industries are attended with risks irrespective of locality—that is, they are equally prejudicial to health whether they are pursued in the country or in the town. But if we compare the death rates of industrial towns with that of the whole country, we shall obtain illustrations of difference in the conditions of life generally rather than in those associated with individual occupations.

All Causes—Death rate per 1000 living, 1890-99

Liverpool	25.7	Dundee	20.9
Manchester	24.3	Edinburgh	19.7
Glasgow	22.4	Aberdeen	19.5
England and Wales	18.4	Scotland	18.6

The contrast between town and country will serve to indicate that aggregation alone—density of population, or the number of persons per acre—is a factor which tends to predispose to ill health, and, if uncontrolled, to an increasing death rate.

While the hygiene of occupation, or more correctly the control of the conditions of occupation inimical to health, is placed by statute in the hands of the home secretary through H.M. Chief Inspector of Factories acting under the Factory and Workshops Act, the general and local acts relating to health otherwise are administered by the various local authorities, controlled by the Local Government Boards of England, Scotland, and Ireland respectively. For each of these countries a general Public Health Act exists, but there has been an increasing tendency of recent years to amplify the powers therein contained by various local acts to meet the special requirements of individual communities.

Public Health Legislation.—Of late years the rapid multiplication of acts of parliament dealing with public health renders their codification of pressing importance. In general, however, their present scope may be thus described—

(1) The Public Health Act provides machinery for (a) dealing with the prevention and mitigation of infectious diseases, including the provision of hospitals, disinfection stations, &c., (b) the removal of structural conditions which experience has shown are inimical to health and are technically defined as nuisances, (c) the formation of areas for water-supply, and of scavenging districts, (d) the regulation of common lodging houses and of houses let in lodgings, (e) the regulation of offensive trades, (f) the seizure of unsound food, (g) the regulation of new streets and buildings, and (h) the formation of port sanitary authorities.

(2) The Housing of the Working Classes Act, 1890, provides machinery for dealing with insanitary areas and dwellings and obstructive buildings—these latter being such as from their situation with respect to other buildings interfere with ventilation or the proper provision of conveniences necessary to prevent nuisance therein

(3) The Factory and Workshops Act distinguishes between a factory and workshop by the presence of mechanical power, and in its sanitary provisions regulates the lighting, ventilation, overcrowding, and provision of sanitary conveniences in both, and the degree of temperature and moisture permissible in certain industries, such as cotton cloth factories

(4) The Dairies, Cowsheds, and Milkshops Order specially regulates the conditions under which milch cows are to be kept—the cubic space, ventilation, water supply, and drainage of byres, and prohibits anyone suffering from infectious disease to engage in the milk traffic

(5) The Sale of Food and Drugs Act defines 'food' as including any article used by man for food or drink except water and drugs, and 'drugs' as including medicine for external as well as internal use, and prohibits the addition of any article to food which will render its use injurious to health, and the sale of any article which is not of the nature, substance, and quality demanded by the purchaser

(6) The Horse Flesh and Margarine Acts are specially designed to control the sale of these articles

(7) The Rivers Pollution Prevention Act deals with the discharge of solid matters, sewage, trade and mining effluents into streams. And

(8) The Alkali Works Regulation Act regulates the permissible proportion of injurious gases, chiefly HCl and SO₂, in the atmosphere. It applies to alkali works, and to the manufacture of sulphuric acid, nitric acid, chlorine bleaching powder, sulphate or chloride of ammonium and chemical manures

Air and its Impurities—For the normal constituents of the atmosphere which we breathe, reference may be made to article AIR. It is remarkable how constant is the proportion of the gases present in the atmosphere when free movement is possible and impurities are not added. The source and effect of these latter only will be considered here. We may recall, however, the circumstance that carbonic acid (CO₂) which is normally present to the extent of about 0.3 volume per thousand in freely moving mountain or sea air, is almost invariably used to express the amount of organic gaseous impurity contained in the air of any given place—not because it in reality constitutes a dangerous addition in the proportions stated, but for the reason that it becomes a fairly reliable index to the amount of organic impurity present. In other words, a proportion of 1, 2, or even 3 volumes per 1000 of carbonic acid derived from purely chemical sources, as by the discharge of the gas from a chemist's flask containing marble, chalk, or other form of calcium carbonate and hydrochloric acid, would have a different meaning, and could readily be breathed without injury, while the like proportion in overcrowded rooms would cause in many persons nausea and faintness, because of the organic impurities of respiration accompanying it. The proportion of carbonic acid in the air of open places averaging therefore about 3 to 4 volumes per 10,000, it has been further found from experiment that the addition of anything beyond 2 volumes per 10,000 from respiratory sources is accompanied by a feeling of closeness or stuffiness, and the limit of what is called permissible impurity has been

fixed at this. Anything exceeding 6 volumes of CO₂ per 10,000 is regarded as indicating accompanying organic impurity to an injurious extent. The CO₂ in the air is increased by respiration, combustion, and putrefaction, and during fogs, it is diminished by free movement and ventilation. Among the other gaseous impurities of the atmosphere ammonia may be obtained from animal exhalations and putrefactive processes, and sulphuretted hydrogen from gas works, chemical works, and sewers, and from the decomposition of some vegetables. Carbonic oxide results from imperfect combustion, and is given off by cast iron stoves. Minute organisms also are present in the air, being most numerous at midsummer and least so in winter. Disease germs belong to this class, and the spread of pulmonary phthisis results from the inhalation of the dried sputum of a consumptive patient disseminated in the atmosphere as dust. The dust present in the atmosphere is chiefly mineral, but it may also have a vegetable or animal origin. The injurious effect of metallic dust produces a high death rate among file workers, but stone masons, cotton cloth workers, and the workers in many other trades suffer in a similar although less-pronounced manner.

Sewage gases must be distinguished in their effect from the air of sewers, because in well built, freely-running sewers, which are well ventilated and in which deposit does not take place, the air is scarcely offensive to smell, but when retention of sewage occurs the air is both offensive and injurious, and food exposed to it rapidly undergoes decomposition. General ill health also results, and if the specific germs of infectious disease are not transmitted thereby, the condition of ill health which it produces renders the person extremely susceptible to infection.

From a careful comparison of the results produced by impurities in the atmosphere, it would appear that no form of impurity is so productive of ill health as respiratory impurity, and the reduction of the phthisis death rate in both the Royal Navy and Army consequent on the improved conditions of life on board ship and in barracks was attained almost under the conditions of an exact experiment where nothing was changed save the conditions under which the men slept.

Air analysis for sanitary purposes is usually limited to a determination of the proportion of CO₂ which it contains, and this is most commonly done by Pettenkofer's method, where lime water is used to absorb the acid, and its volume determined by the amount of caustic lime remaining unacted upon, as ascertained by a solution of oxalic acid of known strength.

Ventilation and Air Supply—Experimentally, it has been found that the amount of CO₂ exhaled in respiration varies with the age, sex, and body weight of the individual. It is greater during activity than in repose. Taking average weights, adult males exhale 0.6 of a cubic foot of CO₂ per hour, adult females 0.4, and children about 0.3. If this is represented by E, and the degree of permissible impurity (2 per 1000 cubic feet, or 0.002 per cubic foot) by F, we have a ready means of constructing a formula by which the amount of fresh air necessary for the individual per hour may be ascertained.

Thus $\frac{E}{F} = D$ = the number of cubic feet of fresh air required per hour = $\frac{0.6}{0.002} = 3000$ cubic feet.

In practice, however, this amount is never attained except in the open air, and even under conditions of mechanical ventilation the amount of CO₂

has been found to reach from 10 to 15 volumes per 10,000. Under the climatic conditions obtaining in this country, a change of air in rooms could not be accomplished, except by mechanical aid, without causing an injurious degree of draught, more frequently than three times per hour, and this would require, as we have seen, an initial space for each individual of 1000 cubic feet. Considerations of expense largely dominate both the amount of initial air space which is allowed and the mechanical appliances for changing the air, but in some instances the legislature has fixed a minimum, or empowered local authorities to do so. This in all cases falls short of the physiological requirement—250 cubic feet being fixed per worker under the Factories' Act, from 300 to 400 per inmate in common lodging houses, the Education Department requires 80 cubic feet per scholar as a minimum in board schools, for soldiers in barracks 600 cubic feet is required, in seamen's cabins it is only 72 feet per head.

Ventilation may be either *natural* or *artificial*, the latter term being restricted to the use of mechanical appliances for extracting the air or for propelling it into and through buildings, although ventilating shafts and similar devices, aided or not by applied heat, are of the nature of artificial aids to ventilation. Natural ventilation depends primarily on difference in temperature between the inside and outside air, aided by wind pressure. A well going chimney establishes an exhaust for the contained air of a room, but although there are many devices for supplying the air which is to replace this, these have not in their application to ordinary dwelling houses reached any degree of perfection, and practically the air of rooms enters by the window or door. Among the advantages of a mechanical system are to be included its constancy, and the control which can be exercised over the source from which the supply is drawn, but it is expensive. Natural ventilation, on the other hand, is inadequate for all buildings in which large numbers are to be accommodated, as in schools and theatres. See the article **WARMING AND VENTILATION**.

Water—The ultimate source of a water supply is of course the rainfall, but practically our supplies are derived from springs or wells, in which case the water is usually hard from impregnation with mineral matter derived from the various strata through which it has passed—or from natural reservoirs, such as lakes, yielding usually a soft water impregnated only with peaty or vegetable matter—or from rivers and streams, which again are liable to impurities derived from the surface of agricultural land, or the uncontrolled discharge of sewage from the scattered hamlets or houses along their course. The proportion of the rainfall which sinks into the soil varies with its nature. Upon sand or gravel almost 90 per cent passes to the deeper layers, while through clay practically no percolation takes place. The impurities which water may contain, and which may affect health prejudicially, depend, on the one hand, on its solvent action on the strata through which it passes, and from which it obtains lime and salts which produce hardness. The domestic inconveniences of a hard water only require mention, but dyspeptic troubles are sometimes caused, especially to persons in whom the digestive processes are weak or impaired. The more important impurities are derived from manurial and sewage pollution, to which most natural collections are exposed.

Springs and Wells—From the surface on which it falls, water may obtain much impurity of an organic nature which becomes oxidized by filtration through the upper layers, and unless deep-well waters are exposed to sewage pollution through

fissure, such as frequently occurs in chalk formations, they are usually good. With shallow or surface wells the area of filtration is not only smaller, but the proximity of dwellings or manured fields forms a constant source of possible pollution, and except the contrary is proved by actual analysis, the water of a shallow well in inhabited places should always be viewed with suspicion. Enteric fever most notably frequently follows their use, and Altona, a suburb of Hamburg, experienced an outbreak of cholera in 1892 after the disease had abated in the latter place, because river water, into which its sewage had been discharged, was distributed unfiltered through an accidental defect in the filter caused by frost. Rain, in falling through the atmosphere, washes it of the solid impurities which it contains, and it frequently drives impurity also from the surfaces on which it falls. Apart from this it is soft, well aerated, and potable.

Mode of Water Supply—It has been estimated that from 10 to 15 gallons per head per day are required for domestic use. Baths require about 6 gallons, and the amount for trade purposes and for street washing or watering is liable to wide fluctuation. Probably about 30 gallons per inhabitant per day represents the average supply in most towns in this country, but in some it reaches from 50 to 60 gallons daily. In sparsely peopled districts the rain water obtained directly from roofs, &c., is supplemented by wells sunk to a greater or less depth, but in all save the deeper wells the supply is inconstant in periods of drought. To protect from surface pollution all wells should be lined with brick and well protected outside. The brick lining should be continued a foot or two above the surface and cemented over. For any considerable population a gravitation supply is necessary to ensure constancy and protect against pollution. Even under those conditions constancy in the service, especially at the higher levels in towns, is only attained through the use of service cisterns placed in the attics, but special care is here necessary to protect these cisterns from pollution, and wherever possible their use should be abandoned.

Purification of Water—Boiling removes hardness by driving off carbonic acid, which holds in solution much of the lime salts, and it destroys all microbic life. But boiled water is unpalatable, unless subsequently aerated by frequent decanting or other device. Certain chemical processes also are frequently resorted to to diminish the hardness arising from excess of lime.

Filtration acts partly mechanically by straining off suspended matter, but its value depends chiefly on the oxidation of organic impurities. The process is the same whether the intention is to render a doubtfully pure water potable or to purify sewage, and the most recent development of the processes of bacterial treatment of sewage is but an extended application of the principle on which the purification of water supplies depends. The aim in all is to oxidize the organic matter, ammonia, and nitrites present, to nitrates, which is the ultimate inorganic form which the nitrogen of the organic matter assumes. Into all processes of effective filtration the element of time largely enters, and if the volume of liquid to be dealt with is large, the area of the filter-beds must be proportionately extended. Many well-designed filters fail in attaining their object, because the rate at which water is passed through them renders bacterial action inadequate. Domestic filters of the ordinary type do not remove microbic life, but that known as Chamberland's, which is made of unglazed porcelain, or the Berkefeld filter, which is made of infusorial earth, possesses the advan-

tage of being sterilized by heat. All of them require care to overcome blocking if the water has much organic matter, and the block carbon variety may be scrubbed and then purified by running an acid solution of permanganate of potassium through them.

The construction of filters on a large scale is requisite when the water of a gravitation supply is derived from a doubtful source, or is exposed to manurial impurity from cultivated fields. These filters are practically large reservoirs underdrained by loosely jointed pipes, and consisting of successive layers from above downwards of fine, then coarse sand, and gravel of increasing size, the whole forming a layer several feet thick. The rate of filtration should not exceed 4 inches per hour if the best results are to be attained.

The action of soluble waters on lead has been the subject of much enquiry. Hard water produces a crust in the interior of pipes consisting of carbonates and sulphates of lead and lime or magnesium, and these salts protect the lead from further action. But soft waters, especially those from moorland districts derive from peaty soils indefinite acids, which are apparently the result of microbic action, and which exercise a solvent action on lead. In Shiffield this has been combated by the addition of powdered chalk to the water, while elsewhere other alkalies have been used.

Food.—We can only briefly indicate here the several classes into which the food substances are divided, and the ultimate purpose which each serves.

(1) Nitrogenous foods include all animal and vegetable albuminoids. Their chemical constitution is extremely complex, but the red flesh of animals may be taken as the type. In digestion they are converted chiefly by the gastric and pancreatic juices into soluble peptones. Their main purpose is to build up the tissues of the body, and they leave the body in urea, urates, &c.

(2) Fats are obtained from animal or vegetable sources.

(3) Carbohydrates include the sugars and starches. Both fats and carbohydrates are readily oxidized, they form the main sources for the production of muscular activity and heat, and are resolved into carbonic acid and water.

(4) Salts, such as the chlorides and phosphates of lime, potash, and soda, are present in all animal substances, and, together with the various organic acids, which also many vegetables contain, maintain the alkaline state of the blood.

(5) Water and condiments.

From a table given by Notter & Firth, the following illustrations may be taken of the varying proportions in which these substances are present in several articles of food—

Articles of Food	In 100 parts					
	Proteids	Fats	Carbohy- drates	Salts	Nitro- gen	Car- bon
Beef, lean,	20.0	3.5	—	1.6	3.2	12.62
" medium	20.5	8.4	—	1.6	3.28	13.57
Mutton medium,	17.11	5.77	—	1.33	2.73	12.87
Pork, lean	20.25	6.81	—	1.10	3.24	15.43
Eggs, hen's,	13.50	11.60	—	1.0	2.16	15.45
Milk, cows,	4.20	3.70	4.50	0.7	0.67	6.67
Cream,	2.70	26.70	2.80	1.80	0.43	22.40
Butter, salt	—	80.00	—	3.00	—	60.00
Cheese, Dutch	28.00	23.00	1.00	7.00	4.48	31.50
Bread, average	8.00	1.50	40.20	1.30	1.28	27.25
" wheat,						
Oatmeal,	12.60	5.60	63.00	3.00	2.01	38.35
Potatoes,	2.00	0.16	21.00	1.00	0.32	10.57
Peas,	22.00	2.00	53.00	2.40	3.52	36.35

After much experiment and observation of men under different conditions of work and rest, it has been ascertained that the nitrogen required will vary from something like 200 to over 400 grains in twenty four hours, and the carbon from 4000 to 6000.

Food in Relation to Disease.—Irregularity in diet, both with regard to the intervals between meals and the quantities taken, results, if continued, in disordered assimilation accompanied by constipation or diarrhoea. Overeating results in accumulation and fermentation, while prolonged inefficiency of diet ends in wasting of the body, with impairment of the mental faculties. Scurvy follows the prolonged exclusion of fresh vegetables from a dietary, and rickets in children is related to an excess of starchy food. The food animals, such as the ox, sheep, pig, are themselves liable to various forms of parasitic disease, such as the *Trichina spiralis* of the pig, and *Tenia* of the ox and sheep. These may be imparted to man in imperfectly cooked food. In addition, Anthrax and Tubercle are properly parasitic, although they are due to a micro organism which cannot be detected by the unaided eye. But disease also may follow the consumption of food which has undergone putrefactive decomposition, the poisonous agency in this case being a chemical product of bacterial origin, technically known as a ptomaine. The various inflammatory affections of animals also render their flesh unwholesome, and the flesh of an animal which has died may cause illness in the consumer. Good butcher meat should be firm and elastic to touch—not watery nor discoloured, and healthy fat has a firm and white appearance, and is free from blood staining.

Preservation of Meat.—Of late years a considerable portion of the meat supply of the country is imported from abroad in a chilled state—not frozen, but kept in an atmosphere somewhat above freezing point. The other methods of preserving it are drying, pickling, tinning, or the application of preservatives to the surface.

Milk.—Much attention has been directed to the milk supply in recent years, because of the conviction that tuberculosis in man is in great part related to the prevalence of the disease in animals. Two royal commissions have already dealt with the question, and now a third is conducting an experimental enquiry into the interchangeability of the human and bovine forms. The first commission elicited in a most definite manner the very considerable reduction which had taken place in the death-rate from pulmonary phthisis (which is the form the disease most commonly assumes in adults) during the last thirty years, although this was coincident with a largely increased consumption of butcher meat as part of the staple diet of the population of the country, but they also noticed that in the forms of tuberculosis which are almost special to children (abdominal tuberculosis), almost no reduction had taken place, and the suggestion most obviously arising from this contrast was that the chief portion of the disease which man acquired from animals was obtained through the milk supply. This appeared to find support in the then recent discovery that the udder of the milk cow was liable to be invaded by the disease, and that when this was the case the tubercle bacillus could be recovered from the milk. More recently Koch has thrown some doubt on this, and it is with the view of elucidating this point that the present commission has been appointed. The bulk of medical opinion in this country has not followed Koch, and in any case, whatever view may ultimately be held as to whether tuberculous milk may transmit the disease to the

consumer, it is obviously desirable that such milk should not be sold. Special regulations under the Cow sheds, Dairies, and Milkshops Order aim at the exclusion of such milk from sale, and in many places the milch cattle are examined periodically for the presence of the disease among them.

Soils—The influence which soils exert on health is largely dependent on their physical characteristics. Loose porous soils do not retain moisture, but they may be readily impregnated with sewage pollution. Heavy clayey soils are cold and damp. Moisture is present in the soil to a varying extent. In all permeable soils, but at varying depths from the surface, the ground air which fills up the interstices of the upper layers gives place to water. The upper surface of the underground water is liable to constant and wide fluctuation. Rise in the level of the ground water results in expulsion of a large volume of ground air which is always laden with moisture, and the warm interior of dwelling houses aspirates the ground air through its basement.

Ground air is always cold and damp, the presence of decaying vegetable matter may render it impure, and if the surface has been polluted by sewage its noxious effects become evident. In Germany it is still held that fluctuations in the level of ground water influence the prevalence of enteric fever, and although the relationship has not been demonstrated in this country, there is on the other hand, ample evidence here that the diarrhoeal diseases are influenced by subsoil conditions. Ballard, of the English Local Government Board, demonstrated the close relationship between the movement of the diarrhoeal death rate and sub soil temperatures. Without knowing, therefore, specifically, the part played by ground air in the propagation of disease, it is abundantly evident that the superficial layers of the soil contain not only the pabulum on which organisms may grow, but the heat and moisture, which are quite as essential.

In addition to the specific diseases, it seems probable also that moisture in the soil may, by inducing catarrhal conditions, predispose to phthisis, and the late Sir George Buchanan, principal medical officer of the English Local Government Board, demonstrated the close association between the decreasing death rate from this disease, and the extension of drainage systems.

Made soils, and especially ground which has been levelled up by the deposit of organic material, is particularly injurious to the health of the inhabitants if built over, and some building regulations prohibit the erection of dwellings on these soils until a sufficient time has elapsed for the destruction of all organic impurity, or the protection of the inhabitants from the effluvia which may arise, by such means as covering the whole surface with concrete. The custom, however, is not nearly so uniform as its importance demands.

With reference to the hygienic importance of certain geological formations, Parkes has classified them in the following way—

(1) Metamorphic and trap rocks are impervious and generally healthy. If they become disintegrated, however, the interstices may become filled with organic debris and unhealthiness result.

(2) The limestones, but particularly magnesium limestone, are in some districts associated with the formation of goitre and calculus from the magnesium salts which become dissolved in the water supply.

(3) Chalk if permeable and free from clay is healthy, and water obtained therefrom is good although hard, but is liable to pollution through fissures.

(4) Sandstone is usually healthy, but water may be retained if clay is present.

(5) Sand and gravel are usually healthy, except where impregnated with sewage pollution. All clay soils are damp and unhealthy.

Drainage—This subject being fully treated in the article SEWAGE, only a few general remarks will here be made. We have already seen the effect of subsoil drainage in reducing the phthisis death rate, and in general it may be said that the subsoil drainage of building sites where dampness exists is quite as important as the provision of a system for removing sewage. The waste matters of households may be roughly described as consisting of (1) liquid refuse, (2) ashes, vegetable and animal refuse, and (3) excreta, but a distinction must be drawn between the two methods by which the last is dealt with. The only form which is applicable to a large community is a sewerage system, while for individual houses and small villages dry conservancy is possible, but between these two there is this difference, that while the water-carriage system removes the sewage from the immediate neighbourhood of houses, it must be ultimately purified before being discharged into running streams, while in the system of dry conservancy the product may be applied directly to the land as manure. The discharge of crude sewage into streams being prohibited by the Rivers Pollution Act, various efforts have been made to render the effluent from sewage pure, and attempts have been made to accomplish this by many processes, which roughly fall into two divisions (1) precipitation, and (2) bacterial treatment. Precipitation processes aim at removing the organic matter both chemically and mechanically, and for this purpose lime, alumina, iron, &c., are amongst the most commonly used. The bacterial process, on the other hand, aims at dissolving the organic matter by the anaerobic micro organisms which are present in the sewage.

In a general comparison of the advantages of the water carriage over the dry system, it may be said that the universal experience of communities has declared in favour of water carriage, because of the opportunity for rapid removal from the neighbourhood of dwellings which it affords, and that in any case the removal of slop and surface rain water requires the provision of a system of sewerage to which little addition to the primary cost is necessary if it also is to accommodate sewage.

The retention of any form of refuse in the proximity of dwellings being objectionable, the reduction in the size of the ashpit to the necessities of a single day may be said to represent the ideal standard at which all systems aim, but the householder has the question of ashpit refuse very much in his own hands by utilizing much more largely than is the custom at present the kitchen fire for the cremation of a large part of domestic refuse. Trade refuse requires special treatment, and its removal from the offensive trades may be specially regulated under the Public Health Act in order to prevent nuisance arising.

Infectious Disease—Several factors enter into the present conception of infectious disease. It implies the presence of an infecting agent and of a soil suitable for its reception, and the parable of the sower not inaptly expresses the relationship. Both may vary—the seed, in its degree of vitality, which may be exalted or lowered, and the soil, in the degree of suitability which it possesses. On the relationship of both, virulence of attack in the individual depends. The infecting agent is a micro-organism (see GERM THEORY). Its existence is assumed in all cases, in some its presence has been demonstrated. The bacilli of tubercle, enteric fever, diphtheria, anthrax, glanders, plague, have

all been recognized, and may be cultivated outside the body in suitable culture media. Some of them are common to both man and animals, as anthrax, glanders, plague, in tubercle the identity of the human and the bovine variety is presently under investigation. Among the more commonly recognized methods by which infection travels are the following—

(1) By the breath (as in typhus, small pox, measles, diphtheria, scarlet fever, mumps, &c.), although it is probable that in many the expired air simply becomes the carrier of infection derived from the fauces and buccal and nasal mucous membranes, and expelled by sneezing, &c.

(2) By separation of particles from the skin, as in scarlet fever and small pox.

(3) By the excretions, urinary and faecal, as in enteric fever, cholera, and plague, by the mucous secretions of throat and nose in diphtheria and scarlet fever—by the sputum in pulmonary phthisis, and by the saliva of rabid dogs. But as in many of these illustrations the virus is retentive of its vitality outside the body, articles of clothing becoming soiled with these discharges retain the infection in an active form, and transmission of infection by clothing to considerable distances has been frequently established against almost all of them. In some, water carriage is also possible. Enteric fever outbreaks have frequently followed the pollution of a water supply by the excreta of a patient suffering from the disease, and cholera also is notoriously a water-borne disease. Milk is a common vehicle for the transmission of enteric fever, scarlet fever, diphtheria, and tubercle—although in this last instance the more common source of the pollution is the diseased udder of the animal.

But while there may be variations in the virulence and dosage of the infecting agent, there may be, as we have seen, variations also in the suitability of the soil in which it is sown. If the soil is suitable, the individual is said to be susceptible—otherwise he may be described as immune. The simplest illustration of this is afforded by the fractional proportion of infants who are, at the time of vaccination, insusceptible to it. We may leave aside for the moment the question whether this results from inefficient lymph, or insufficient effort to vaccinate, and take the registrar-general's statement that a certain number are annually returned as insusceptible. It might be said that in a certain number of persons exposed to infection only a proportion will be attacked, just as in a battle, where the chances of bullet injury are assumed to be equal, only a certain proportion are hit, but immunity depends on something less obviously mechanical than this. The immunity which an attack of infectious disease so frequently confers may be explained by exhaustion of the soil, or by the production of a chemical product in the course of its development which confers on the tissues the power of actively opposing every effort at re-invasion by the particular organism. But without the aid of a previous attack there exists a function of the white corpuscles of the blood known as *phagocytosis* by which the organisms of disease are dealt with as the scouts of an invading army and are attacked, and on the issue of the contest hangs the question whether the disease will or will not obtain a foothold. This function of phagocytosis is active in all healthy persons, when its activity is depressed, the individual is said to be susceptible to disease. It is probable that it enters largely into all questions of heredity to certain diseases—the patient inherits, not the disease, but the susceptibility to it, and the difference between the two statements lies in the fact that the susceptibility may be created in one who is not hereditarily susceptible.

SANJAK (Turkish, 'a standard') is the name given to the subdivision of a province in the dominions of Turkey, having at its head a *mutessarif* or governor of the second rank.

SAN JOSE, a city of the United States, capital of Santa Clara county, California, in the valley of Santa Clara, 50 miles s.e. of San Francisco, with which it is connected by rail. The streets are wide, cross each other at right angles, and are well supplied with water. San José contains a handsome court house, the state normal school, a female Catholic college, a theatre, public halls, &c. The manufactures embrace silk and woollen goods, lumber, flour, &c., and there are also tanneries, foundries, and machine shops. There is an active trade in wheat, wine, tobacco, flour, canned fruits, &c. The city has a delightful climate, and is celebrated for its many beautiful gardens and delicious fruits. Pop (1880), 12,567, (1890), 18,060.

SAN JOSE, a town of Central America, capital of the state of Costa Rica, 15 miles w.n.w. of Cartago, the former capital. It stands on a table land 4500 feet above the sea level. Though comparatively recent in its origin, it has a number of important institutions, including a university, and has succeeded to the importance and commercial activity of Cartago. Pop (1892), 39,112.

SAN JUAN, a frontier and western province of the Argentine Republic, bounded on the west by the Andes, north by the province of Rioja, and south by the province of Mendoza. Area, 33,715 square miles, pop (1900), 94,991. The climate is for the most part mild and agreeable, and the country is well watered and very fertile. It contains rich gold and silver mines. In the south-east of the province is the large Lake of Guanacache. Its capital is a town of the same name, with a pop of 11,000 in 1901.

SANLUCAR DE BARRAMEDA, a seaport of Spain, in Andalusia, at the mouth of the Guadalquivir, in a sandy, treeless district, 18 miles north of Cadiz. It is a dull and decaying, though well-built place, with broad, straight, and indifferently-paved streets. The principal buildings are the churches, a town house, an English hospital dating from 1517, and the Duchess of Montpensier's palace, with valuable art treasures. The inhabitants are chiefly employed in agriculture and fishing, and there is some trade in wines. Sanlucar was the starting point of Columbus in his third voyage, and of Magellan in his voyage in 1519. Pop (1887), 22,667.

SAN LUIS POTOSI, a city of Mexico, capital of the state of same name, 92 miles south-east of Zacatecas, regularly laid out and well built, with spacious and well kept streets. The silver mines in the vicinity were formerly much more important, but are still very productive. The chief buildings are the cathedral, the mint, the governor's palace, the city hall, the palace of justice, the churches, and the markets. The Alameda has a statue of Hidalgo, the Mexican patriot. Pop (1895), 69,050.

SAN MARINO. See MARINO.

SAN MINIATO, a small town of Italy, in the province of Florence, 21 miles w.s.w. of the city of Florence, on the Arno. It has an old cathedral, and is adorned with many interesting monuments. It is famous in the history of the Florentine Republic, and is the original seat of the Bonaparte family.

SANNAZARO, JACOPO, a distinguished Italian poet who wrote both in Latin and Italian, was born at Naples in 1458. His *Arcadia*, a series of idylls, although like his other Italian poems, the work of his youth, still retains its reputation. His poetry attracted the notice of King Ferdinand and his

sons Alphonso and Frederick, who made him the companion of their journeys and campaigns. Frederick, who ascended the throne in 1496, gave him the delightful villa of Mergellina, with a pension of 600 ducats. But in 1501 his benefactor was obliged to abdicate the throne and flee to France, and Sannazaro was too faithful to desert him in his reverses. After the death of Frederick he returned to Naples, and died there in 1533. Sannazaro wrote sonnets and *canzoni* in Italian, several Latin poems, elegies, eclogues, epigrams, and a longer poem, *De Partu Virginis*, in three books. His elegance of expression, no less than the poetical beauty of his thoughts, gave him a distinguished place among the modern Latin poets.

SANQUHAR, a royal, parliamentary, and municipal burgh in Dumfriesshire, Scotland, 26 miles N N W of Dumfries, in the hollow of a range of hills of no great elevation, a short distance from the Nith. It consists chiefly of one extremely irregular street. The houses are in general well built of freestone obtained in the neighbourhood. There are Established, United Free and other churches, a fine public hall erected in 1882, a town hall with a clock tower, ruins of an ancient castle near the town, and till 1885 there was a free school. There are here brick and tile works, spade and shovel works, &c., and coal is worked in the vicinity. Sanquhar unites with Dumfries, &c. (the Dumfriesshire burghs) in sending a member to Parliament. It became a burgh of barony in 1484, and a royal burgh in 1596. Admirable Crichton is supposed to have been born at a mansion in the neighbourhood. Pop. (1891), 1315, (1901), 1379.

SAN REMO. See REMO (SAN)

SAN SALVADOR (more correctly SALVADOR), a republic in Central America, bounded north and east by Honduras, north west by Guatemala, south-east by the Bay of Conchagua or Fonseca, south by the Pacific Ocean, area, about 7500 square miles. Its coast line, which extends nearly 150 miles, is deeply indented, particularly in the south east, and furnishes several good harbours, of which the most frequented are La Unión, within the Bay of Conchagua, the roadstead of Libertad, and Acajutla or Sonsonate, the last two connected by rail with the capital. The surface from the shore north for about 15 miles is moderately low and level, but it shortly after becomes broken and rugged, and is traversed by mountain masses in distinct groups giving it a wild appearance. This is increased by no fewer than five active and six other volcanoes, which may be considered the distinguishing features of the state. The most notable of the active volcanoes is Icalco (6000 feet), whose cone was formed as recently as 1770, but San Miguel (7100), Santa Ana (6660) and San Salvador (6182) are all higher than it. The other active cone is Ilopango (5100). San Vicente (7600), Chinameca (5000), and Conchagua (3915) are only quiescent. Earthquakes are common. The inequality of surface produces a considerable variety of climate, which inclines to cold in the higher, and becomes excessively warm in the lower districts near the coast, but taken as a whole it is very healthy. The largest river is the Lempa, which, issuing from the Lake of Guiza, flows south east forming part of the boundary between Salvador and Honduras. Other streams, though generally of small dimensions, furnish the means of irrigation, and thus dispense fertility in all directions. The most important and next in magnitude to the Lempa, are the Parra and the Sirama or San Miguel. Besides Lake Guiza already mentioned, there is another called Ilopango, 5 miles east of the town of San Salvador, which was much altered by violent volcanic disturbances in

1879. The soil possesses great fertility, and the whole state is one of the best cultivated in Central America. The most important crop is coffee, which is generally grown, and is both abundant and of excellent quality. Sugar and tobacco are the other chief vegetable products, indigo is but little grown now owing to the competition of chemical substitutes, wheat does not succeed except in a few places, and fruits, though by no means deficient, are neither so various nor so abundant as in the state of Guatemala. Cattle of a fine race, and hogs and poultry, are numerous, but sheep are few and very indifferent. Gold and silver are extracted, but not to any great extent. Iron of excellent quality exists, and is worked, it is admirably adapted for making fine steel. The part of the coast between Acajutla and Libertad is famous for producing the 'balsam of Peru'. The value of imports is estimated at over £600,000, and that of exports £1,800,000, the principal items among the latter being coffee, indigo, sugar, balsam, and tobacco. The population is made up of whites (of Spanish descent), Spanish-speaking Indians, *Ladinos* (a mixed race of whites and Indians) negroes, and mulattos. Roman Catholicism is the religion established in the state. Education is free and compulsory. The government is carried on by a president, vice president, and four ministers. There is a congress of forty two deputies, elected annually by universal suffrage. For administrative purposes the republic is divided into fourteen departments. The inhabitants have the reputation of being the most industrious in Central America, and the state, in proportion to its size, is the most densely peopled. The largest cities are San Salvador, the capital, Santa Ana, San Miguel, Nueva San Salvador, San Vicente, and Sonsonate. San Salvador was taken possession of by Pedro de Alvarado, a lieutenant of Cortes, after a long and obstinate resistance and remained under Spanish rule until 1821, when it asserted its independence, and joined the Mexican Confederation. In 1823, however, it seceded, and subsequently formed part of the Republic of Central America. In 1853 it became an independent republic. Its constitution dates from 1864 and was amended in 1880, 1883, and 1886. With Nicaragua and Honduras it formed during 1896-98 the Republica Mayor de Centro-América. The progress of San Salvador, like that of the other Spanish American republics has been much hindered by internal dissensions, revolutions and counter revolutions following each other without end. It has also had wars with its neighbours at various times, but these we need not enter upon. Pop. (1901) 915,512.

SAN SALVADOR, a town in Central America, capital of the state and near the southern base of the volcano of same name. It was founded in 1525, about 6 miles north of its present site, to which it was removed in 1539. In 1854 it contained about 30,000 inhabitants, and had nine churches, one of them a large and beautiful cathedral, a university, a female seminary, several hospitals, and an active trade. In the night of 16th April it was so completely overthrown by an earthquake that the government laid out a new city under the name of Nuevo San Salvador 10 miles nearer the sea, so many of the inhabitants, however, chose to remain and rebuild their ruined houses, that the old city was reinstated as the seat of government. The houses are mostly of one story, and on account of the earthquakes wood is largely used. The town is a thriving place, with a large trade in the staple products of the country, and it has railway communication with the ports of Acajutla and Libertad. Pop. (1901), 59,540.

SANS-CULOTTES (French, 'without breeches'), the name given in derision to the Jacobins or popular party by the aristocratical in the beginning of the French revolution of 1789. Like the epithet *gueux* (which see) bestowed on the patriot party in the Netherlands, and like that of *Methodists* bestowed on the friends of Wesley, it was adopted by those to whom it was first applied by way of contempt. At the time when the most exaggerated principles of democracy prevailed *sans-culottism* became a term of honour. In the French republican calendar the *jours complémentaires* were at first called *jours sans-culottides*. See CALENDAR.

SAN SEBASTIAN, a city and seaport of Spain, capital of the province of Guipuzcoa, on the side of Mount Urgull, at the extremity of a low sandy tongue of land, washed on the east by the Urumea, here crossed by a bridge, and on the north and west by the Bay of Biscay, and attached to the mainland only on the south by a narrow isthmus, 42 miles N N W of Pampeluna. It is a place of great strength both by nature and art, being surrounded by walls, washed by the sea, though partly left dry at low water, and otherwise defended, both by outworks and by the castle of Mota, placed at an elevation of about 430 feet on the summit of Urgull. It is built in the form of an irregular pentagon, and having been nearly destroyed by a conflagration in 1813, when it was taken by the British, consists for the most part of modern houses, arranged with considerable regularity in spacious streets and squares. The more important public buildings are the parish churches of San Maria and San Vicente, a nunnery, a hand some court house with a Doric portico, navigation, commercial, and other schools, theatre, and hospitals. Near the town, on the shore of the fine bay known as La Concha, is the new royal palace (1889-92). Sail-cloth, anchors, cordage, beer, soap, leather, &c., are manufactured. The harbour is small, exposed, and difficult of access, and the trade, once important has greatly decayed. It is a favourite watering place, with fine bathing facilities, promenades and a casino. San Sebastian is a place of considerable antiquity, and having by its early fortification become the key of Spain on the side of France figures much in all the wars between the two countries. Of the numerous sieges to which it has been subjected the most celebrated, and at the same time the most disastrous, was that of 1813, when, being in possession of the French, it was stormed by the British with a loss of about 5000 in killed and wounded. The greater part of the town was laid in ashes, it having been set on fire by the French in order to annoy the British. Pop (1886), 23,072.

SAN SEVERINO, a town of Central Italy, in the province of Macerata, and 14 miles W S W of the town of Macerata, on the right bank of the Potenza. It is the see of a bishop, and has a cathedral and several other churches. The vicinity produces good wine, oil, and fruit. Pop 3196.

SAN SEVERINO, a town of Southern Italy, in the province of Foggia, 39 miles E N E of Campobasso. It is a large and tolerably well-built town, and contains a cathedral, three parish churches, four monasteries, a nunnery, seminary, and hospital. In 1053 Robert Guiscard gained a signal victory here over Pope St Leo, who was taken prisoner. Pop (1881), 19,756.

SANSKRIT LANGUAGE AND LITERATURE *Language*—Sanskrit is the name given to the learned and classical language of the Hindus, the language in which most of their vast literature is written, but which has not been a living and spoken language since about the second century before Christ. It is one of the Aryan or Indo-European

languages (see INDO-EUROPEAN), and may be described as an elder sister of the Greek, Latin, Persian, Slavonic, Teutonic, and Celtic tongues. It is, accordingly, allied to most of the modern European languages, including the English, German, Danish, Dutch, French, Spanish, Portuguese, Italian, Walachian, and Russian. The name Sanskrit, from *sam*, with, and *kṛta*, made, means carefully constructed or symmetrically formed, and was given to the language to distinguish it from the vernacular dialects, which were called *Prākṛit*, that is, common or natural. It is probable that Sanskrit, in its more highly elaborated form, was never spoken by any great body of the people. At any rate we find very early that while Sanskrit was employed exclusively for literary and sacred purposes the mass of the people spoke *Prākṛit* dialects, which dialects were the ancestors of most of the dialects spoken in Upper India at the present day. Sanskrit, therefore, stands in the same relation to the modern Aryan dialects of India as Latin stands in to the Romance languages.

The alphabet in which Sanskrit is written is called the *Nāgarī*, or *Devā-Nāgarī* (divine or royal city). Various forms of this alphabet exist, the earliest dating from several centuries before Christ, but the one now used cannot be traced farther back than to a period several centuries after Christ. The *Devā-Nāgarī* alphabet is a most complete and philosophically constructed alphabet, and in these respects offers a strong contrast to our own, which is so ill adapted to the various sounds it is called upon to express. Every letter in Sanskrit has one invariable sound. There are in all fourteen vowels and thirty-three simple consonants, besides a nasal symbol and a symbol for a final aspirate. All the vowels except short *a* are represented by two characters, one used when the vowel begins a word, the other in all other cases. Sanskrit is read from left to right. The letters, in their dictionary order, with their Indo Romanic equivalents and their pronunciation, exemplified by English words, are shown in the following table (see Professor Monier Williams's *Sanskrit English Dictionary*). In it long *a*, *u*, and *i* are represented by *ā*, *ū*, and *ī*, but in articles in the present work the long sound has sometimes been represented by a circumflex or an acute accent—

VOWELS

Initial	Medial	Equivalents and Pronunciation.
अ	(none)	a as <i>a</i> in rural, mica.
आ	ā	as <i>a</i> in tar, father.
इ	i	as <i>i</i> in fill, lily.
ई	ī	as <i>i</i> in police.
उ	u	as <i>u</i> in full, bush.
ऊ	ū	as <i>u</i> in rude.
ए	e	as <i>e</i> in merryly.
ऐ	ai	as <i>i</i> in marine.
ओ	o	as <i>o</i> in revelry.
औ	au	the above prolonged.
अ	e	as <i>e</i> in there.
इ	ai	as in aisle.
ओ	o	as in go, stone.
औ	au	as in Haus (German), or <i>ou</i> in mouse.

CONSONANTS Equivalents and pronunciation.

क	k	as k in kill, seek.
ख	kh	as kh in inkhorn.
ग	g	as g in gun, get.
घ	gh	as gh in log-hut
ङ	n	as n in sink, sing
च	ç	as çh in church
छ	çh	as çhh in church hill.
ज	j	as j in jet
झ	jh	as dyeh in hedgehog.
ञ	n	as n in singe
ट	t	as t in true
ठ	th	as th in ant hill.
ड	d	as d in drum
ढ	dh	as dh in red haired.
ण	n	as n in none
त	t	as t in water (in Ireland)
थ	th	as th in nut hook (more dental)
द	d	as d in dice (more like th in this)
ध	dh	as dh in adhere (but more dental)
न	n	as n in not, nut
प	p	as p in put, sip
फ	ph	as ph in uphill.
ब	b	as b in bear, rub.
भ	bh	as bh in abhor
म	m	as m in map, jam.
य	y	as y in yet, loyal.
र	r	as r in red, year
ल	l	as l in lull, lead.
ळ	l	sometimes for d in Veda.
ल्ह	lh	sometimes for dh in Veda.
व	v	as v in ivy (w after consonants)
श	s	as s in sure, session
ष	sh	as sh in shun, bush
स	s	as s in saint, hiss.
ह	h	as h in hear
ॠ	ṇ or m	nasal symbol, like n in French mon, or the symbol of any nasal.
ः	h	symbol for final aspirate.

All the above letters may be referred to one or other of the five classes of gutturals, palatals, cerebrals or linguals, dentals, and labials, according to the organ principally concerned in their pronunciation, whether the throat, the palate, the upper part of the palate (cerebrals), the teeth, or the lips, and may also be divided into 'hard' and 'soft,' according as the

effort of utterance is attended with expansion or contraction of the throat. This twofold division is shown in the following table —

Hard or Sord Letters.		Soft or Sonant Letters.	
Gutturals	k kh	a ā	g gh n h.
Palatals	ç çh	ī ē ai	j jh ṇ y
Cerebrals	t th sh	ī rī	d dh n r.
Dentals	t th s	lī rī	d dh n l.
Labials	p ph	u ū o au	b bh m v

The vowel *a* is written only at the beginning of a word, and in other cases is left unwritten, as it is understood to be a regular appendage to every consonant, and unless one of the other vowels takes its place is pronounced as a matter of course. Accordingly such a word as *naṇaṇa* is expressed by means of the three consonants *ngr* alone. When several consonants come together without *a* or any other vowel between them they are joined together into one character, and thus form a compound or conjunct consonant. In this way Sanskrit possesses 400 or 500 distinct characters. Generally speaking, we can trace in these compound consonants the original elements of which they are formed, but in some the elementary letters are quite obscured. The vowels *e* and *i*, when not initial, are written above the consonant after which they are pronounced, while *u*, *ū*, *rī*, *rī*, and *lī* when not initial are written below the consonant after which they are pronounced, and *z*, when not initial, strange to say, is always written before the consonant after which it is pronounced. *R* when not initial, and coming before a consonant in a word, is written in the form of a small semicircle above the consonant.

Sanskrit displays a remarkable fondness for what are usually termed euphonic changes of letters, such changes, for example, as are exhibited in the Latin *rex* for *regis*, from *rego*, *traxi* for *trahis*, from *traho*, *appellatus* for *adpellatus*, or in the Greek *sumballō*, from *sun* and *ballō*, *plekthēnar* for *plekthēnar*, from *plekō*, *graphēn* for *graphēn*, from *graphō*, *peperismenos* for *pepithēmenos*, from *peithō*, &c. This kind of letter-change is carried, however, to a far greater extent in Sanskrit, and is applied not only in uniting parts of a word together but in combining complete words into sentences. Thus the Latin phrase, 'Rara avis in terris,' if it were Sanskrit, would become, by the laws of *Sandhi*, or combination, 'Rarāvīr īns terrīh,' or might take the shape of a single word, 'Rarāvīr-īnsterrīh' (M. Williams). It would be out of place to give anything like an exposition of the rules of *Sandhi* here, but we may present the reader with a few examples — *Hita* + *upadeśa* = *hitopadeśa*, goodly instruction, *alpa* + *ojas* = *alparajas*, little energy, *tu* + *udanum* = *tuḍānum*, but now, *īti* + *maya* = *ītmaya*, formed of intellect, *bhayāt lobhāt* = *bhayāl lobhāl*, from fear and avarice, *tat* + *śrutvā* = *tat śhi utvā*, having heard that, *kasmīn* + *īti* = *kasmīnśchit*, in a certain person, or to take an example or two from the inflection of verbs *īac* + *si* = *īakshī*, *dah* + *tīsmi* = *dagdhāsmi*, *bh* + *dhi* = *bhīdhi*, &c.

The most remarkable feature in Sanskrit grammar is the prominence given to the etymological analysis of words and the facility with which it can be carried out. To quote Professor Whitney 'As regards the etymological part of grammar the distinguishing characteristic of Sanskrit is—beside the great affluence of forms and the unlimited facility of forming new derivatives and new compounds—its remarkable preservation of original materials and processes, the great regularity and consequent transparency of its formative methods. In most words there is no difficulty in distinguishing from each other root, affix, and termination, and in recognizing the original form

and signification of each. For analyzing words, retracing their history, and referring them to their ultimate roots, the utmost facilities are afforded. This character of the language has determined that of the native science of grammar, on which our grammatical treatment of it is mainly based. The Hindu grammar is essentially analytical and etymological, dissecting out roots, affixes, themes, terminations, and laying down the rules which govern their combination into vocables. About 2000 roots are catalogued by the native authorities, but of these the greater part are of no account, being either slightly varied forms of others or mere grammatical artificialities. The Indo European roots, however, are far more numerous and faithfully preserved in form and in signification by the Sanskrit than by any other member of the family. It is this remarkable conservation of materials and processes which gives prominent importance to the Sanskrit in Indo-European philology, making its introduction the inauguration of a new era in etymologizing, and so in the science of language, which is based on etymology, or the history of individual words. The roots are all monosyllabic, and consist of a single vowel or of a vowel and several consonants, none of the roots containing more than one vowel. A root in its simple form has no definite and complete meaning, thus *kṣip* (throw) does not mean 'I throw,' or 'to throw,' or 'thrown,' but simply conveys the idea of the act of throwing, such other meanings being imparted by means of terminations. The processes of declension and conjugation are looked upon as consisting in the appending of certain terminations to root forms, not usually to simple roots, but to roots modified in certain ways to form inflective or 'crude' bases. The different ways of forming these inflective bases settle the number of declensions into which nouns and the number of conjugations into which verbs are divided.

Sanskrit has a system of case terminations similar to those in Latin and Greek, but in declensional forms it is richer than either of those languages. There are eight cases—nominative, accusative, instrumental, dative, ablative, genitive, locative, and vocative. The instrumental expresses by, or through, or along with, the ablative from, the locative position in. There are three numbers—singular, dual, and plural—and three genders. The usual terminations of the cases are as follows—Singular nominative, *s* (neuter, *m*, or wanting), accusative, *m*, instrumental, *ā*, dative, *e*, ablative, *as* or *t*, genitive, *as* (*asya*), locative, *i*, vocative generally like the nominative, dual nominative, accusative, and vocative, *au* (neuter, *i*), instrumental, dative, and ablative, *bhīām*, genitive and locative, *as*, plural nominative, *as* (neuter, *āni*, *i*), accusative, *as* (masculine, *n*), instrumental, *bhīas*, dative and ablative, *bhīyas*, locative, *su*. Adjectives are declined exactly in the same manner. For the comparative and superlative they take the terminations *tara* and *tama*, or *iya* and *ishīa*. The pronouns have the same cases and numbers, and except those of the first and second persons, distinguish three genders. They are traced back to pronominal roots that appear in the other Indo European languages (see PHILOLOGY), and play an important part in the development of forms and form words. In their irregularities of declension they agree closely with the pronouns in the cognate tongues. The verb in Sanskrit exhibits many striking analogies to the verb in Greek, but it is not so rich in forms. It has two voices, an active (called *Parasmaipada*, that is, word to another) and a middle or reflexive (called *Ātmanepada*, word to one's self). There is a passive form also, but it can scarcely be called a voice in the ordinary sense of the word, being rather a distinct

derivative from the verbal root, and without any necessary community with the conjugational structure of the active verb. Its terminations are those of the *Ātmanepada*. Transitive verbs often appear indifferently in either *Parasmaipada* or *Ātmanepada*. There are ten tenses and moods, seven of which are commonly used—namely, present, imperfect (or first preterite), potential (or optative), imperative, perfect (or second preterite), first future, second future, and three less commonly used—namely, the aorist (or third preterite), the precative (or benedictive), and the conditional. There is also an infinitive mood and several participles. The present, the past tenses, and the two futures belong to the indicative mood, the imperative, potential, precative, and conditional have only one form for the different times, and accordingly they are generally classed as tenses, though really moods. The present, imperfect, imperative, and potential are called conjugational tenses because they exhibit certain modifications of the verbal base, which has led to the classification of the verbs into ten conjugations. The imperfect, aorist, and conditional take the augment *a* (corresponding to the augment *ε* in Greek). The perfect is reduplicated. There is no tense exactly equivalent to the pluperfect. The present, perfect, and future tenses—active, middle, and passive—have participles. The infinitive ends in *um*, and is really the accusative case of a verbal noun (like the Latin supine in *um*). There is also an indeclinable past participle in the shape of the instrumental case of a verbal noun (as *bhūtiā*, having become), which is employed with excessive frequency. Besides the passive, a causal, a desiderative, and a frequentative verb may be formed from any root. There are three numbers throughout the verb, and the usual three persons to each number. The personal terminations are evidently pronominal in their origin. In the present tense all the terminations are—singular, *m*, *s*, *t*, dual, *as*, *thas*, *tas*, plural, *mas*, *tha*, *anti*. In the imperfect they are—singular, *m*, *s*, *t*, dual, *ra*, *tam*, *tām*, plural, *ma*, *ta*, *an*. In the *Ātmanepada* the terminations of the present are—singular, *e*, *se*, *te*, dual, *vahe*, *āthe* or *ithe*, *āte* or *ite*, plural, *mahe*, *dheve*, *ante* or *ate* while the terminations of the imperfect are—singular, *i*, *thās*, *ta*, dual, *rahi*, *āthām*, *ātām* or *ithām*, *stām*, plural, *mahi*, *dhiām*, *anta* or *ata*. Prepositions are scarcely used in Sanskrit to govern nouns, as in other Indo European languages, but as prefixes to verbs they are of constant occurrence. Syntax holds but an unimportant place in Sanskrit grammar, and many grammars do not treat of it at all. 'Whatever expressiveness and rhetorical charm the language has lie chiefly in its boundless wealth of epithets, and not at all in the construction of its sentences and periods—indeed, a period in Sanskrit is next to an impossibility, the formation and connection of its clauses is of the baldest simplicity. The excessive use of cumbrous compounds is also a very general fault in Sanskrit construction, appearing in all styles of composition, but especially the more artificial, to say, for instance, "water-play delighted-maiden-bathing fragrant" (river breeze) for "made fragrant by the bathing of maidens delighted with sporting in the water" is a virtual abnegation of the privileges of an inflected language and a partial retrogradation to the stiff inexpressiveness of the Chinese' (Whitney). There are plenty of Sanskrit compounds much longer than the one translated above. The following is a rather better specimen, it is compounded of eleven different words—*mattamadhukāṇṇakaramuktayān kārāmuktakokilātpāsan gītakasukhāiśahā*—that is, causing pleasure by the music of the voice of the cuckoo blended with the hum emitted by the swarms of joyous bees.

Literature.—Sanskrit literature covers a period extending from at least 1500 B.C. to the present time. It is vast in quantity, and it embraces all the departments of human knowledge with the exception of history. The Hindu mind seems to have always been naturally careless of noting and recording those facts and occurrences that constitute history, and hence great uncertainty prevails in the chronology of the literature as well as in that of the political life of the Hindu race. The great mass of the literature is in metre, even works on science and law having a poetical form. Most of it was written after the language had ceased to be spoken in the fullest sense, and consequently it is to a great extent characterized with a strong flavour of artificiality, all the stronger as modern times are approached.

The oldest literary monuments, by far the oldest of which the Indo-European family can boast, are the Vedas—the Rig, the Yajur, the Sama, and the Atharva Veda. They are believed to date from about 1500 B.C. They are held in the highest veneration by the Brāhmins, and have attributed to them a divine origin. They are looked upon as the source of all the *śāstras* or sacred writings of the Hindus, which, however, include works upon ethics, science, and philosophy as well as religious works. Each of the Vedas is divided into three parts: a part called the *Samhitā* of the Veda, consisting of prayers, hymns, &c. (called *mantras* or *gānas*), the *Brāhmaṇa* or theological part, and the *Upanishad* or philosophical portion. The language of the Vedas is considerably different from the later Sanskrit. We shall give a fuller account of the Vedas and the literature connected with them under the head VEDA.

The *Purāṇas* form another important department of the religious literature, but are very much later than the Vedas, though by the Hindus a great antiquity is attributed to them, their authorship being ascribed to Vyāsa, the reputed arranger of the Vedas. In their present form most if not all of them belong to the last 1000 years, though part of their material may be much older. There are eighteen of them altogether, forming a vast body of literature of varied contents, the subjects treated comprising mythology, legendary history, cosmogony, with many digressions of a philosophical and didactic nature, though some of them also contain descriptions of places, and pretend to teach medicine, grammar, &c. The form which these works take is always that of a dialogue, in which some person relates the contents in answer to the inquiries of some other person, the main dialogue being interwoven with others represented to have taken place between other speakers. The *Purāṇas* have received such names as Vishnu-Purāṇa, Brāhma-Purāṇa, Śiva-Purāṇa, Bhagavata-Purāṇa, Matsya-Purāṇa, &c. They are generally intended to exalt either Vishnu or Śiva as supreme, and thus belong either to the Vaishnava or Śaiva sect, though some of them are unsectarian in character. There are also a number of works called *Upapurāṇas*, which differ little in character from the *Purāṇas*. The law-books known collectively by the name of *Dharmaśāstras* form also part of the religious literature. They give directions to guide the orthodox Hindu in all the varied duties of life, public and private, treat of impurity, of purification and penance, as well as of matters more strictly relating to law. The oldest law book is that ascribed to the mythical personage Manu. Of this work we have already given some account in the article MANU, and in INDIA under the head of Religions. Other important works of this class are the code of Yājñavalkya and that of Parāśara, which have given rise to

various commentaries and digests, the most important of the former being the *Mitāksharā*, while among the latter the *Chintāmaṇi*, *Vyavahāra-Mādhaviya*, *Vyavahāra-Mayāka*, *Viramitrodaya*, *Dāyabhāga*, *Dāyatattva*, &c. are well known names.

In the department of epic poetry the chief productions are the great Sanskrit epics called the *Rāmāyana* and the *Mahābhārata*. It is pretty certain that epic compositions existed in Vedic times, and indeed some of the Vedic hymns themselves may be called epic, but the two poems mentioned, though their exact dates cannot be determined, are certainly post Vedic. Neither of these poems, nor any of the earlier Sanskrit works, was committed to writing till some centuries after its original composition, writing not having been employed in literary composition earlier, it is believed, than about the time of Alexander the Great. The *Rāmāyana* is believed to be the older of the two, and Professor Monier Williams believes that a great part if not the whole of it must have been current in India as early as the fifth century before Christ. The authorship of the *Rāmāyana* is attributed to Vālmiki. The name means expeditor or adventures of Rāma, who was one of the incarnations of Vishnu. There are several Rāmas in Hindu mythology, but the Rāma who is the hero of this work is Rāma-Chandra. 'It narrates the banishment of Rāma under the surname of Chandra (the moon), a prince belonging to the dynasty of the kings of Ayodhyā (Oudh), his wanderings through the southern peninsula, the seizure of his wife Sītā by the giant ruler of Ceylon (Rāvana), the miraculous conquest of this island by Rāma, aided by Sugriva, king of the monkeys (or foresters, the word *bandar* meaning both, or *Rākshasas*, as they are also called), and by Vibhishana, the brother of Rāvana, the slaying of the ravishing demon by Rāma and recovering of Sītā, and the restoration of Chandra to the empire of his ancestors at Ayodhyā' (Small, Handbook of Sanskrit Literature). It consists of 24,000 ślokas or distichs, divided into seven books, the books being divided into chapters. The poem is believed to typify allegorically the extension of Hindu influence and culture over the southern portion of the peninsula of India. An English verse translation of it has been published by Mr Ralph T. H. Griffith. The *Mahābhārata* is a huge epic of about 220,000 long lines, and though a thread of story runs through it the unity of the whole is marred by numerous extensive digressions and episodes. It forms rather a cyclopædia of Hindu mythology, legendary history, and philosophy than a poem with a single subject. It is the production of various periods and various authors, and latterly, at any rate, was avowedly intended to form a thesaurus of such knowledge as was deemed suitable for the second or Kshatriya caste. It is divided into eighteen books, almost any one of which would form a large volume. The authorship of it is assigned to Krishna Dwaipāyana, called Vyāsa or 'the arranger,' but this simply means that the heterogeneous materials of which the poem consists were at some time or other welded together with a certain order and sequence so as to form one work. The leading story narrates the history of the war between the 100 sons of Dhṛtarāshtra, and their cousins, the five sons of Pāṇdu, for the possession of the ancient Kingdom of Bhārata, which is said to have comprised the greater part of India. Dhṛtarāshtra ruled at Hastināpur or ancient Delhi, and here the five Pāṇdu princes were educated, along with their cousins. The former are represented as noble-minded, brave, and amiable, while the latter are mean, spiteful, and vicious. The characters of the Pāṇdu princes are

distinctly drawn, and consistently maintained throughout the poem. After escaping many dangers with which they were threatened from the malevolence of the Kurus, as the sons of Dhritarāṣṭra are called, from an ancestor Kuru, the Pāndus receive a share in the government. Yudhishtira and his four brothers, Bhīma, Arjuna, Nakula, and Sahadeva, accordingly rule at Indraprastha, while Duryodhana and his ninety nine brothers rule at Hastināpur. Afterwards, however, Yudhishtira is infatuated enough to stake his kingdom at dice with Duryodhana, and having lost it, he and his brothers, according to agreement, retire to the depths of a forest, where they spend twelve years in disguise, after which they renew the war. The two armies meet near Delhi, and in the battle, which lasts for eighteen days, all the Kurus are slain, and the Pāndavas obtain undivided possession of the Kingdom of Hastināpur.

The above is an outline of the story of the Mahābhārata, but it remains to mention some of the episodes which are grafted on it. Of these one of the most celebrated is the Bhagavad Gītā or Divine Song. This is a philosophical poem in the form of a discourse between Kṛṣṇa and his pupil Arjuna, one of the Pāndu princes, held in the midst of an undecided battle. 'It gives a full and most curious exposition of the half-mythological, half philosophical Pantheism of the Brāhmins, and a general view of the whole mystic theology of the Hindus. Schlegel calls this episode the most beautiful, and, perhaps, the only truly philosophical poem in the whole range of literature known to us. There is something striking and magnificent in the introduction of this solemn discussion on the nature of the Godhead and the destiny of man in the midst of the fury and tumult of civil war in which it occurs.' It has been often translated. Another episode is that of Nala and Damayanti—the Nalopākhyānam. This is a story related, by way of consolation, by the sage Vṛhadasva to Yudhishtira when the latter was residing in the forest, as above mentioned. Nala was king of Nishadha, and his wife, Damayanti, was the daughter of Bhīma, king of Vidarbha or Berar. Like Yudhishtira, Nala was induced by an evil spirit to play at dice with his brother Pūshkara, and after a succession of losses every thing that he possessed, his kingdom included, became the property of the latter. Nala and Damayanti are forced to wander in the wilderness almost naked, and the king, frantic at his own folly, and thinking that his wife would get on better without him, leaves her alone in the forest. After certain adventures Damayanti returns to her father's house, while Nala becomes master of the horse to the King of Ayodhyā. Damayanti, for the purpose of making her husband declare himself, proclaims that she is to take another husband, and the King of Ayodhyā goes to Bhīma's court as a suitor, taking with him his charioteer, the disguised Nala. Here Nala meets and becomes reconciled with his wife, he then wins back his kingdom from his brother, and begins a just and happy reign. The poem called Harivaṅśa professes to be a continuation of the Mahābhārata, but may also be classed with the Purāṇas. It relates the history of Kṛṣṇa as the incarnation of Viṣṇu.

The taste for the simple epic gradually became extinct, and a class of shorter and artificial poems took its place, written in affected and unnatural language, and overloaded with tasteless ornaments and conceits. Some of these narrate in a condensed form the incidents of the old epics, such as the Bala-bhārata of Amara, which reproduces the Mahābhārata, and the Raghuvāṅśa (Race of Raghu) of Kālidāsa, which tells the story of the Rāmāyana, or they select single episodes, and treat them in a detailed manner, as is done by the Kirātārjuniya

of Bharavi and the Śiśupāla-Badha (Death of Śiśupāla) of Māgha, both from the Mahābhārata. The subject of the former is the contest of the hero Arjuna with the god Śiva, who is clad in the habit of a mountaineer (*kuṭāta*), for the possession of the divine weapons, the latter relates the death of the hero Śiśupāla, and gives an account of Kṛṣṇa's war with him. Two others of these poems treat of the history of Nala—namely, the Nalodaya (Rise of Nala) of Kālidāsa and the Nalashadhiya of Harshadeva. The former handles the subject in the most condensed manner, and is very difficult to understand, the latter, which is unfinished, treats the subject with extreme diffuseness, and is written in an involved and intricate style.

In the province of lyric and gnomic or proverbial poetry we meet with poems of the greatest elegance, full of deep, practical wisdom, true feeling, tender sentiment, and beautiful descriptions of nature. We must mention in particular the Meghadūta (Cloud Messenger) of Kālidāsa, in which a cloud acts as messenger from a demigod to his wife, from whom he is separated, the Ritusanhāra (Circle of the Seasons) of the same poet, the Sayings or Aphorisms of Bhartrihari, the one hundred love stanzas of Amara (Amarasakata), &c. The best collection of gnomic sayings has been published by Bohtlingk (St Petersburg, 1863). The Gitagovinda of Jayadeva, describing the adventures of Kṛṣṇa among the cowherd girls, his separation from and final reconciliation with his wife, is distinguished by the richness of its language and its charming descriptions of nature. A very complete collection of Indian lyric poetry is contained in Habermehl's Sanskrit Anthology (Calcutta, 1847).

The Hindus are the only people of the East among whom dramatic poetry has sprung up as a native growth, but it did not arise among them from the lyric, as it did among the Greeks, but directly from the epic poetry. Though the Hindus can boast of some excellent specimens of this branch of poetry, yet, on the whole, their dramas are much inferior to those of the Greeks or of modern Europe. The drama was hampered with a multitude of rules and regulations as to the composition and performance of the plays, which had grown up in course of time, and could not be broken through. It is curious to observe the minuteness with which dramatic matters were divided and classified, heroes and heroines, for instance, being characterized as belonging to about 150 different categories. As to the subject matter, either legends of the gods are handled, as in the Śakuntalā (translated into English by Sir W. Jones and also by Professor M. Williams) of Kālidāsa, which may be classed among the finest flowers of poetry of all times and peoples, and in the Vikramorvasī (the Hero and the Nymph) of the same author, or they are founded on incidents of common life, as the Mṛcchakatī (Clay Cart) of Sudraka and the Mālātī Madhava of Bhavabhūti. Others are historical, as the Mudrā Rākṣasa of Viśikhadatta, or are dramas of intrigue, such as the Mālavikā and Agnimitra of Kālidāsa and the Ratnāvalī of Harshadeva. Even the farce, in which the crimes of the Brahmins, their deceit and profligacy, are unsparingly lashed, is not unknown. The Mṛcchakatī, the oldest known drama, is believed to belong to the first century before Christ. The plays are written in mixed prose and verse, and the lower characters and all females are made to speak not in Sanskrit but in Prākṛit, only the higher male characters using the former. See Wilson's Select Specimens of the Theatre of the Hindus.

The Hindu poetic tales and fables have exercised a most important influence on the whole

literature of the East, and even on that of our own middle ages. Among the collections of this class are especially to be mentioned the *Panchatantra* (Five Books), from which Europe derived the *Fables of Bidpai* (or *Pilpay*) and the *Hitopadesa* (Salutary Instruction), a somewhat later collection of the same materials, also the twenty five Tales of the Demon, seventy Tales of the Parrot (which gave rise to the well known stories of the Seven Wise Masters, &c.) The *Kathā-sarit sāgara* (Ocean of Streams of Narration) or *Vṛhatkathā* (Grand Tale), compiled by Somadeva of Cashmere in the eleventh century, is an extensive collection of the best Indian tales (edited by Brockhaus, with a German translation) The *Dasakumārācārītra*, or *Adventures of the Ten Princes*, dates also from the eleventh century

The scientific literature of India is likewise large The first place is due to the grammatical works, which are very large and very thorough, Indian grammarians having carried phonetic and etymological analysis farther than it has ever been carried except by modern European science Works on grammar were composed at a very early period, but the oldest work extant is that of Pāṇini, which belongs to the second or third century before Christ, though some would make it considerably earlier Immense as the grammatical literature is, it almost entirely consists of continuations of and commentaries on this work Pāṇini has studied brevity at the expense of intelligibility, and his rules resemble so many algebraic formulæ, each requiring a commentary to enable any one to understand it Other native grammars worthy of mention are the *Siddhānta Kaumudī* of Bhaṭṭarī Dikṣita, a kind of abridgment of which, the *Laghu Kaumudī*, has been translated into English by Dr Ballantyne In mathematics the Hindus have greatly distinguished themselves, and are to be regarded as the inventors of algebra as well as of the decimal system of notation, and of the Arabic numerals, so called only because they were introduced into Europe by the Arabs, who received them from India In astronomy the Indians have distinguished themselves by accurate observations of the time of the earth's revolution round the sun and the moon's round the earth, correct measurements of the earth's circumference, &c One of the oldest systematic text books of astronomy is the *Sūryasiddhānta* (translated into English, Newhaven, 1860) To this must be added the works of Brahmagupta and Bhāskara, of which only the latter has as yet been translated into English (Calcutta, 1863) The medical science of the Hindus is by no means insignificant, and their medical literature is well worth study Susruta's system of medicine is the most celebrated work In rhetoric we have the text book of Visvanātha (*Sahityadarpana*), in English by Ballantyne (Calcutta, 1850), in prosody the work attributed to Kālidāsa called *Srutabodha* On music and the other fine arts there are also books extant, but as yet comparatively little attention has been paid to them by Europeans

In philosophy the Hindus have produced some remarkable works The beginnings of philosophical speculation go back to a very high antiquity We find even in some of the hymns of the *Rig Veda* attempts to solve the riddle of the origin of the world and similar problems, and such questions become much more prominent in the later portions of the *Vedas*, especially in the *Upanishads* In the epic poems long didactic passages are frequently interspersed, which in many cases assume the form of complete philosophical treatises in verse To this class belongs the *Bhagavadgītā* already mentioned There are six chief systems of Indian philosophy The *Sāṅkhya* system of Kapila regards the world

as having gradually developed itself out of primitive and pre-existent matter, and as it does not teach the existence of a supreme being it was accused by its opponents of being atheistical The *Yoga* system of Patanjali is supplementary to the *Sāṅkhya*, its main object being to establish the existence of a supreme being and to show how the human soul may become permanently united to him The *Mīmāṃsā* endeavours as its special object to reconcile and bring into agreement the doctrines set forth in the divine revelations and to determine their true sense The older *Mīmāṃsā* of Jaimini (generally called simply the *Mīmāṃsā*) is chiefly directed to matters of ritual, while the *Vedānta* (or younger *Mīmāṃsā*) of Vādarāyana treats of the nature of the Supreme Being and his relation to the world The doctrines of these two schools form the dogmatic grounds on which the prevailing religious body of India is founded The remaining schools are the *Nyāya* of Gautama and the *Vaiśeṣika* of Kanāda, both especially logical in character, and maintaining that the world arose from atoms which arranged themselves into various forms at the will of a ruling spirit The ultimate object of all Indian philosophic inquiry is to show how we may escape the curse of transmigration and attain everlasting happiness by becoming completely absorbed in the deity, and the above six systems are different methods propounded with this view Our knowledge of the Indian philosophy is yet very defective, however, though the text-books of some of the schools, as the *Sāṅkhya*, *Vedānta*, and *Nyāya*, have been printed The best general treatise on the Hindu philosophy is Colebrooke's *Essays on the Philosophy of the Hindus*, works on the different schools are such as Wilson's *Sāṅkhya-Kārikā*, or *Memorial Verses of the Sāṅkhya Philosophy*, Saint Hilaire, *Essai sur la Philosophie Sāṅkhya*, Windischmann, *Sankara, sive de theologumenis Vedanticorum*, Roer, *Bhāṣhā Paricheda*, or *Division of the Categories*, Muller, *On Indian Logic* With regard to works for the study of Sanskrit we may mention among grammars those of Whitney, Monier Williams, and Max Muller in English, the first being the most comprehensive We have mentioned some of the native works already Among native dictionaries we may mention the *Nirukta* of Yāska, which treats only of the rarer words, such as occur in the *Vedas*, the dictionary of Amara Sinha (the *Amara Kosha* edited and translated by Colebrooke), that of Hemachandra, and the encyclopædic dictionary of Rādhākānta Deva The best Sanskrit English dictionary is that of Professor M Williams (new edition, 1900), and we may also mention those of Macdonell and Cappeller Professor Williams has also an English Sanskrit dictionary The Sanskrit-German dictionary of Professors Bohtlingk and Roth is the great thesaurus of the language It was begun in 1853, and took twenty five years to finish Among Sanskrit reading books for beginners we may mention Johnson's edition of the *Hitopadesa*, Professor Williams's edition of the *Story of Nala* from the *Mahābhārata*, Lanman's *Sanskrit Reader*, Bopp's *Selections from the Mahābhārata*, the *Bhagavadgītā* of Schlegel and Lassen or Thomson, the *Sikuntalā* of Williams or Bohtlingk, Johnson's *Meghaduta* &c

SANS SOUCI (French, 'without care'), a palace near Potsdam, where Frederick the Great was fond of residing, hence he is sometimes called the *philosopher of Sans souci*

SANTA CATHARINA, a state in the south of Brazil, between lat 26° and 29° S, and from lon 49° to 51° 30' W It is bounded on the north by the state of Paraná, on the east by the Atlantic, on the south by the state of Rio Grande do Sul, and on

the west by the Argentine territory of Misiones, and includes the island of the same name and several smaller ones on the coast, area, 28,620 square miles. It is composed of a series of valleys running west to east, formed by spurs of the boundary mountain range, and watered by numerous streams, of which the rivers São Francisco, Aracary, Tapeçu, Tijuca, and Tubarão may be named, all falling into the Atlantic. The soil, though in the lower lands sometimes sandy, is remarkably fertile, the climate mild, and the seasons regular. Sugar, rice, mandioca, millet, beans, onions of immense size, and garlic are the chief cultivated products, considerable quantities of which are exported to Rio de Janeiro. The indigo and cochineal plants grow spontaneously, and wheat and flax give good returns. The state is well wooded, producing excellent timber both for the joiner and the cabinet maker. The Indians claim the supremacy over some of the forests, which are likewise frequented by ounces, coats, monkeys, pigs, and other animals. Birds are numerous, including several varieties of humming birds, and the lakes and rivers are frequented by innumerable geese and other water fowl. Some of the rivers are navigable for a short distance. Desterro is the capital. Pop (1890), 283,769, including 50,000 Germans.

SANTA CRUZ. See CRUZ (SANTA)

SANTA FE, capital of New Mexico, in the United States of America, on the Atchison, Topeka, and Santa Fe, and Santa Fe Southern railways, 20 miles from the Rio del Norte, and in the heart of the Rocky Mountains. The houses are mostly built of unburned brick, the streets are narrow and crooked, and the aspect of the town is uninviting. Among notable buildings are the Governor's Palace, built in 1598, a long one-story structure with very thick walls, the capital U.S. government building, court house, cathedral, a university, and several other institutions for higher education. There was an Indian town here as early as 1541, and the place was occupied by the Spaniards in 1605. It became the capital of the territory of New Mexico in 1851. It is the centre of a considerable overland trade. The population in 1890 was stated at 6185.

SANTA FÉ, or SANTA FÉ DE LA VERA CRUZ, a town of the Argentine Republic, capital of the province of same name, advantageously situated at the confluence of the Salado with the Parana, 230 miles N.W. of Buenos Ayres. It stands on a height, the only one which occurs in a district remarkable for its uniform flatness, and has several tolerably regular but narrow streets, and a plaza of considerable dimensions. On the latter stand an ancient and a modern church, and the Cabildo, by far the largest and most imposing building in the town, other buildings are a Dominican and a Franciscan monastery, each with its own church, the guard house, surmounted by a tower. The quay is solidly built of brick, and the principal trade is in hides, and in the excellent timber obtained from the forest on the banks of the Salado. Pop (1901), 22,500.

SANTA FÉ DE BOGOTÁ. See BOGOTÁ

SANTA FÉ DE GUANAJUATO, See GUANAJUATO

SANTA HERMANDAD. See HERMANDAD

SANTA MARIA DI CAPUA VETERE, a town of South Italy, in the province of Caserta, 3 miles south east of Capua. It is built on the site of ancient Capua, and there are many remarkable ruins to be seen. The manufactures consist of cloth and other woven materials and hats. The neighbourhood produces abundance of fruit, oil, wine, &c. Pop of commune, 17,896.

SANTA MARTHA. See MARTHA (SANTA)

SANTA MAURA. See LEUCADIA.

SANTANDER, a city of Spain, capital of the province of same name, 207 miles north of Madrid (to which a railway runs almost direct), on the southern side of a projecting tongue of land, on an estuary opening eastwards into the Bay of Biscay, and affording good anchorage and shelter, but exposed to winds from the south. On the north and north west the city is protected by elevated grounds, which towards the westward face the Atlantic, and here there is a large bathing establishment. The environs are pleasant, and the walks on the high grounds command beautiful views. There are fine promenades, such as the Paseo del Sardinero leading to the bathing establishment. Santander may be divided into the high and low town, and the latter into two portions, the old and the new. In the more ancient quarter the streets are narrow and straight, and the houses lofty, while in the modern the streets are spacious as well as straight, and the houses of moderate elevation but good architecture. Altogether the place has much the aspect of a French town. There are a number of squares, large and small, a cathedral with a fine crypt, a town-house and prison, theatre, public markets, hospital, asylum for the indigent, foundling hospital, custom-house, an institute or college for higher education, schools of navigation, commerce, and design, a normal school, and numerous primary schools. Santander is a busy, thriving, and at the same time a cheap and well provided place, the fish, both of sea and fresh water, are plentiful and excellent. It has a government cigar manufactory in which 1000 persons are employed, shipyards, paper works, foundries, brewery, cooperages, fish curing establishments, tanneries, manufactories of refined sugar, candles, vermicelli, hats, &c. Much has been done within recent years to improve the harbour accommodation of Santander, and there are now a large graving-dock as well as another dock and extensive wharves. Large areas of land have been reclaimed from the sea, and are already partly built on, while a fine esplanade has been formed, with public gardens and a new quay skirting it. The channel leading to the dock has now 20 feet of water at neap tides. The chief export from Santander is iron ore, most of which is sent to the United Kingdom, Germany also receiving a considerable quantity. Other exports are flour, wine, provisions, &c. The imports are much more valuable, consisting of manufactured articles from Britain, France, &c., such as machinery and various kinds of metal goods, textiles, and other articles, and of such foreign produce as cotton, cacao, coffee, tobacco, petroleum, timber, dried fish, &c. Here, as in Bilbao, porter's work is done by women. Santander is an ancient place, being probably the Roman *Portus Blendrum*. Here Charles V. landed (July 16, 1522) to take possession of Spain, and from the same quay Charles I. of England embarked to quit Spain after his romantic visit to Madrid. Santander was sacked by Soult in 1808. Pop (1897), 50,640. The province is bounded by Biscay, Burgos, Palencia, and Oviedo, has an area of 2111 square miles, and a population in 1897 of 263,673. It is bounded on all sides but the north with lofty summits, possesses extensive forests, mines of iron and lead, and grows a great deal of grain.

SANTANDER, FRANCISCO DE PAULA, general and president of the Republic of New Granada, born at Rosario de Cucuta there in 1792, was educated in Bogota, and on the commencement of the South American revolution in 1809 took up arms to assist his countrymen in throwing off the Spanish yoke. Distinguishing himself in this career he gradually rose to be general. His corps contributed essentially to Bolivar's victory, which in 1819 led to the founda-

tion of the Republic of Columbia. When in 1821 the congress of the new republic met at Rosario de Cucuta to arrange a constitution, he was appointed vice president, and in consequence of the absence of President Bolívar, who was engaged in carrying on the war, the sole management of the government fell to be conducted by Santander. Misunderstandings afterwards arose, and having become implicated in a conspiracy against Bolívar and the existing order of things, he was arrested and condemned to perpetual banishment. He quitted the republic in 1829, and proceeding to Europe travelled through England, France, and Germany. Meanwhile Bolívar having died, and the Republic of Columbia having been subdivided into three, Santander was invited to return. He arrived in 1832, and was immediately appointed President of New Granada for four years. Factions still continued to prevail, and in 1833 a conspiracy against his life was discovered at Bogotá. He succeeded both in saving himself and in maintaining tranquillity, but resigned in 1836, and died at Cartagena in 1840.

SANTAREM (ancient *Praedium Julium*), a town of Portugal, in the province of Estremadura, on the side and top of a rugged hill above the right bank of the Tagus, 46 miles north east of Lisbon. It consists of tolerably well built but in many instances ruinous houses, and has many interesting antiquities, numerous churches, seven monasteries, two nunneries, a diocesan seminary, two grammar schools, an orphan and an ordinary hospital, and a considerable trade in oil, grain, and wine. The surrounding country is remarkable for its fertility. Pop. 9800.

SANTELE. See CAIAWAHA.

SANTIAGO-DE CHILI, the capital city of the Republic of Chili and of the province of the same name, is situated in a large and fertile plain at the foot of the Andes, lat. 33° 27' S., lon. 70° 41' 38" W., at an elevation of about 1500 feet above sea level, and 90 miles S. E. of Valparaiso. It is watered by the Mapocho, a rapid stream issuing from the Andes, which divides it into two unequal parts, connected together by a substantial stone bridge, the principal one being on the northern or right bank of the river. Santiago was founded on February 12, 1541, by one of the early Spanish conquerors, Pedro de Valdivia, and it very soon became a populous and opulent city, but it was only when Chili threw off the yoke of the mother country that it sprang into real and active life. From that time it has steadily and rapidly advanced in civilization, population, and wealth, and it is now fully entitled to be ranked among the most important and flourishing cities in South America. Few places can boast of a finer situation, more delightful climate, and grander scenery than Santiago. The climate is at once genial and salubrious, and supports a vigorous vegetation, which includes every necessary and many of the luxuries of life. Large canals, fed from the Mapocho, have been cut at great expense through tracts of land formerly mere barren wastes, and what was before without the least value has become through this means a perfect garden teeming with all the varied productions of this favoured clime. The country immediately round Santiago is very well cultivated, and is chiefly made up of small properties or farms belonging to the wealthy, with tasteful villas on them, where they generally go to spend the summer months. Not a few of these are extremely pretty, and fitted up in a style of comfort and elegance not often exceeded in similar residences in Europe. Santiago, like all Spanish cities in the New World, is laid out in squares intersecting each other at right angles. The streets are well paved, and the town has been recently lighted with electricity and

supplied with tramway lines. Owing to the prevalence of earthquakes, which are much dreaded by the natives, the houses are mostly of one story, though there are many of two, and generally occupy a large space of ground, having gardens and patios or courts in the interior, intended to afford a refuge to the family on the occurrence of these dreadful convulsions. All the houses are plentifully supplied with water from the Mapocho. A better style of architecture has been introduced of late years, and many stately mansions are now to be seen fitted up with great splendour and elegance. The Plaza or Great Square is a large open area adorned with a fine fountain, on the north side is the municipal building and criminal courts, the post office, and the old palace, an irregular heavy looking pile, formerly the residence of the presidents, now used as barracks, the south side is ornamented with lofty piazzas, where, and in the neighbouring arcade, called Bulnes' Arcade, are to be found most of the fashionable shops in the city. This is the favourite resort of the fair Santiaguinas, particularly after mass in the morning, when they are seen in their church dress, so striking to a stranger, and at the same time so appropriate and elegant. On the west side stands the cathedral, a capacious and not particularly fine edifice, built of a coarse kind of porphyry, successive shocks of earthquakes have seriously injured its walls and arches. In another church 1600 persons, principally ladies, were burned to death on Dec. 8, 1863, during a festival. The fire was communicated from the altar lights to the drapery with which the building was profusely decorated, and while it was crowded with worshippers. There is a fine monument commemorative of this disaster. The capitol or parliament house is an imposing structure. The Moneda or Mint has a stately and commanding appearance, a part of this large building has been fitted up as a palace for the president and as offices for the ministers. There is also a fine theatre erected at a cost of about £120,000. Santiago is an archbishop's see, the seat of the supreme government, of the courts of law, and of the legislature. It has also numerous churches and monastic establishments, two large and well endowed hospitals, that of San Juan de Dios for males, and that of San Francisco de Borja for females, a lunatic asylum, &c. There are in Santiago several daily newspapers besides other periodical publications. The University of Santiago, formerly San Felipe, obtained its first charter from the King of Spain in 1738, it has five faculties, namely, philosophy, mathematics and physical sciences, medicine, law, and theology. The Instituto Nacional (National Institute) is the oldest and best conducted college in Chili, and here are educated the children of the wealthy families destined for the learned professions. There are besides numerous private schools, where are taught the usual branches of education. The Military Academy is a government institution for the education of young men intended for the army and navy, it is conducted on the French system, and has done much to improve the *personnel* of both services. The Normal School is of modern erection, and is intended for the training of those destined for public tuition in the government schools, it is under the superintendence of the minister of finance. The National Museum is not extensive, but contains a good collection of minerals and many interesting specimens of the animal and vegetable kingdoms, particularly of such as are peculiar to Chili. There is a medical board (Protomedicato) for the special object of examining candidates for the medical profession. The national library contains about 40,000 volumes, among which are numerous ancient and

rare manuscripts. Santiago has railway communication with Valparaíso and other towns. The inhabitants are naturally affable and courteous, and are remarkably kind and hospitable to strangers, whom they readily admit into their circles. The children of the wealthy are all taught foreign languages, particularly French and English. All classes are remarkably fond of music, and many have acquired a degree of proficiency in it rarely exceeded in older and more advanced countries. There is a conservatory of music. Pop (1900), 291,725.

SANTIAGO-DE-COMPOSTELLA, a city of Spain in Galicia, in the province and 32 miles south of Coruña, picturesquely placed on an eminence, with an uneven and irregular site. The houses are generally of three stories, and well built, streets for the most part broad and paved. Many of the latter radiate from the cathedral, which occupies the centre of the city. It is a damp, cold, sombre looking place. On the noble Plaza or square the bull fights take place, and fire works are let off, especially on the day of Santiago (St James the Elder), the patron of the city and of Spain. Among the public edifices are the cathedral, dedicated to Santiago, completed in 1128, well preserved and very striking internally, the episcopal palace, the hospital, a grand building, the town house, built after the plan of the royal palace at Madrid, with a fine equestrian statue of Santiago on its façade, the College of Fonseca, now suppressed, the enormous convent of St Martin, partly overhanging a ravine, and with a fine garden, it was once one of the wealthiest of the Benedictine establishments, now it is a barrack and its chapel a parish church, the university, a heavy building with an Ionic portico, but with a fine court in the simple Doric. The town is well supplied with promenades and fountains, and washed by two small streams, the Sar and the Sarella. There are also mineral springs in the neighbourhood. It has manufactures of leather, numerous hand looms, flour mills, and many silversmiths engaged in making great numbers of little gilded images, teraphims, and luccs, as well as medallions of Santiago, which are purchased by pilgrims. Santiago declined after the Reformation, which diminished the number of pilgrims, offerings, and legacies, and the removal of the captain general and the *audiencia* to Coruña has completed the impoverishment by taking away the military, the legal profession, and clients. Pop (1857) 24,300.

SANTIAGO DE CUBA, a seaport town on the south east coast of the Island of Cuba, lat 19° 57' 29" N, lon 76° 3' 45" W. It is the oldest town of the island, is well built, consisting of a handsome square and a number of straight and regularly formed streets lined with houses constructed for the most part of stone, is the see of an archbishop, and has a fine cathedral and several other churches, some convents and hospitals, and a harbour, which, though difficult of access from being narrow and crooked at the entrance, is spacious and deep within, and defended by several strong forts. Its trade is considerable, both with Europe and America, the chief exports being sugar, rum, cacao, coffee, tobacco, and mahogany. Pop (1899), 43,090.

SANTORIN, THERA, or CALLISTE, the largest of a small group of islands in the Archipelago, 60 miles north of Crete. It is in the shape of a horse shoe, with its extremities pointing west, and has a circuit of about 30 miles, though its breadth nowhere exceeds 3 miles. The shores of the inner curve present frightful precipices from 500 to 1200 feet high, and are evidently the edges of a crater, but they slope gradually down to those of the outer curve, which are tolerably flat. The whole of this slope is of beautiful appearance, and may be regarded as

one continued vineyard. The wines produced, furnishing the principal staple of the island, are *vino-brusco*, a rough or dry wine resembling Rhénish, and *vino-santo*, a dark red and very luscious sweet wine, scarcely inferior to that of Cyprus. The chief places of the island are perched on the edges of the precipices, and have a very singular appearance. Volcanic phenomena have in recent times manifested themselves near this island, and in 1866 three small islands were thrown up from the bottom of the sea, the appearance of these being heralded by loud booming noises and flames issuing from the sea. One of the islands became by its increase of size united to the mainland, another became united to the small island of Nea Kaimeni, itself produced by volcanic action in 1707. Pop in 1889, 11,924.

SANTOS, a town in Brazil, in the province and 50 miles S S E of São Paulo, on a bay of the South Atlantic. It stretches for a considerable distance along the bay from S S E to N N W with comparatively little breadth, and is on the whole well built, having several wide and spacious streets containing many elegant and stately houses. Among the public buildings are several churches and monasteries, a town house, custom house, and two hospitals. Its marshy site, however, makes it very unhealthy, and the evil is greatly aggravated by imperfect cleansing and sewerage. The harbour, which is the best in the province, and the chief outlet for its products, is the emporium of a very extensive trade, in which the principal articles of export are coffee (the great staple), sugar, tobacco, hides, lard, bacon, and other provisions. The only imports are various articles of European and American manufacture. Pop (1898), 16,000.

SAO FRANCISCO, a river of Brazil, which rises in the Serra da Canastra, in the south west of the province of Minas-Geraes, flows N N E through that province and the province of Bahia, then turning east forms the boundary between the provinces of Pernambuco and Alagoas on the north and Bahia and Sergipe del Rey on the south, and falls into the Atlantic 50 miles N N E of the town of Sergipe del Rey by two mouths, one to the north, called Aricari, so shallow as to be scarcely navigable even by canoes, and the other to the south, hence called Francisco do Sul, much larger and deeper, but unfortunately encumbered at its mouth by a large bar about 6 miles broad, covered with a heavy surf, and with seldom more than 4 feet of water on it. It is a large and majestic river, with a course which has been estimated at 1600 miles, but, in addition to the bar at its mouth, has numerous rapids and cataracts, which make its continuous navigation impossible, those at Paulo Affonso, about 190 miles inland, are about 60 miles in length. Its principal affluents are, on the right, the Paraopeba, Guacuhí or Velhas, Jequitahí, and Verde, and on the left the Andaraí, Borrachudo, Abatê, Paracatu, Urucaia, Carminha, Correntes, and Grande.

SAÔNE (ancient, *Araar*), a river of France, rises at Viomenil, in the department of Vosges, flows south-west through that department, enters the department of Haute-Saône, which it traverses, flowing first south east, then south west, and immediately on quitting it for the department of Côte d'Or, is greatly augmented in volume by the accession of the Ognon. Thereafter it continues its south-west course, passing Auxonne, and receiving its most important tributary, the Doubs. After reaching Chalon its course becomes almost due south, past Mâcon to Lyons, where it joins, or, from its volume, may more properly be said to be joined by the Rhone. Its whole course is about 280 miles, of these 190 miles are navigable. The importance of

Its navigation is greatly increased by means of three canals—the Canal du Centre, Canal de Bourgogne, and Rhone and Rhine Canal—which bring it into communication respectively with the Loire, Seine, and Rhine.

SAÔNE, HAUTE (Upper Saône), a department of France, bounded on the north by the department of Vosges, east by Upper Alsace, south by Doubs and Jura, south west by Côte-d'Or, and north-west by Haute-Marne, area, 2028 square miles. This department consists in a great measure of an extensive basin inclosed by a succession of mountain ranges, and is drained by the Saône, the Ognon, and several small tributaries. The climate is upon the whole more temperate than that of the adjoining departments, but is subject to sudden and violent alternations, particularly in spring, by which vegetation often suffers severely. The mountainous part of the department, which comprises about a fourth of the whole, is extremely rugged, and the soil is arid, so that the ordinary cereals are scarcely able to maintain a languishing existence. The rest of the department, lying within the extensive basin already referred to, is very fertile, and has a surface finely diversified by gentle slopes, often covered with vineyards, extensive, well watered, verdant meadows, and productive corn fields. The crops raised, after satisfying the home consumption, leave a considerable surplus for export. About one half of the whole surface is arable, and considerably more than one-fourth is covered with wood, which furnishes excellent timber, and is one of the principal sources of wealth. In addition to cereals flax and hemp are extensively cultivated, the ordinary fruits generally thrive well, and some districts are almost covered with cherry plantations, the produce of which is employed in the manufacture of cherry brandy. The minerals of the department are numerous, but by far the most important is iron, which is so extensively worked and manufactured as to form the most important branch of industry. The other principal articles of manufacture are cotton tissues, paper, glass, and earthenware. The trade is chiefly in corn, flour, iron and ironmongery, wine, wood, butter, cheese, horses, and cattle. For administrative purposes the department is divided into three *arrondissements*—Vesoul (the capital), Gray, Lure—subdivided into 28 cantons and 583 communes. Pop (1901), 265,179.

SAÔNE ET LOIRE, a department of France, bounded on the north by Côte-d'Or, east by Jura, south east by Ain, south by the Rhone and Loire, and west by Allier and Nièvre, area, 3270 square miles. It is traversed north to south by a mountain range, which forms the commencing chain of the Cevennes, and divides the department into two distinct basins. In addition to the two rivers from which the department takes its name, important water communication is afforded by the Canal du Centre. The climate is in general temperate and healthy. More than one half of the whole surface is arable, and one sixth is in wood. The waste land is about one thirtieth. The soil on the whole is not of remarkable fertility, the grain raised barely sufficing for the consumption. The finest part of the department is the valley of the Saône, where the surface is beautifully diversified by hill and dale, valley and plain, vine-clad slopes, rich pastures, and fertile corn fields. The vine is extensively cultivated, and though none of the wines are finest quality, they are much esteemed as *vins ordinaires*, and largely exported. Those in most repute bear the name of Mâcon. Hemp of excellent quality is grown in several cantons, and attention has lately begun to be paid to the culture of the mulberry for rearing silk-worms. Excellent cattle are reared on

the pastures, and the horses, though generally of small size, are hardy and active. The most important mineral is coal, of which there is an extensive field, but the quality is inferior. Iron is also partially worked, but the ore is seldom rich, and there is a mine of manganese. The most important branch of industry is the manufacture of iron. After it may be mentioned leather, glass, linen and cotton goods, hats, and earthenware. The trade is chiefly in agricultural produce, coal, iron, wine, and leather. For administrative purposes the department is divided into five *arrondissements*—Mâcon (the capital), Autun, Chalon sur Saône, Charolles, Louhans—subdivided into fifty cantons and 589 communes. Pop (1896), 619,036, (1901), 616,389.

SÃO PAULO, a maritime state of Brazil, in the southern portion of the republic, lat 20° to 26° s, and lon 44° 30' to 55° w. It is bounded on the north by the state of Minas Geraes, on the west and the north west by the state of Matto Grosso, on the south by the state of Parana, and on the east by the Atlantic Ocean, area, about 112,330 square miles. The coast line stretches north-east to south west for above 400 miles. Part of it in the north east is bold and rocky, but the rest is generally low. At a short distance behind it, however, the surface begins to rise rapidly, and soon terminates in mountain chains, which have a direction nearly parallel to that of the coast. These chains, composed chiefly of granite, form the great water shed of the province, dividing it into two basins of very unequal magnitude, that on the east side consisting of a belt of land along the coast, which sends its waters directly east to the Atlantic by numerous small streams, or north east to swell the channel of the Parahiba, while the far larger basin, comprehending at least four fifths of the surface, belongs to the Parana, which bounds the province on the west, and drains it by a vast number of streams, of which the most important are the Iguagu and Tieté. The mountains are generally clothed with forests, furnishing inexhaustible supplies of the finest timber, particularly cedar and pine, and the lower slopes, and the valleys and plains which lie along the banks of the river, are, with few exceptions, of great fertility. The principal crops grown are sugar cane, coffee, rice, millet, mandioc, tobacco, and haricots. Lying just beyond the tropics the climate is mild and healthy. The province is well supplied with means of communication both by land and water, and has several harbours on the coast, particularly that of Santos, admitting all ordinary sailing vessels. An important trade is carried on with the interior, which sends by land, chiefly to Rio de Janeiro, horses, cattle, and swine, and exports by sea rice, coffee, sugar, bacon, tobacco, cheese, and *maté*, or Paraguay tea. For administrative purposes São Paulo is divided into seven *comarcas*—São Paulo, Santos, Curitiba, Itu, Jundiáhi, Taubaté, and Franca. This province has attracted a considerable number of immigrants from Europe, especially Italians and Germans. The legislative assembly holds its sittings in the town of São Paulo. Pop (1890), 1,384,753.

SÃO PAULO, a town in Brazil, capital of the above state, on an elevated but uneven piece of ground, between two small streams, 220 miles w s w of Rio de Janeiro. The principal edifices are the cathedral, more remarkable for its size than its architecture, the parish church of St Iphigenia, several monasteries and convents, with churches attached, the governor's and the bishop's palace, the town-house, prison, infirmary, and military hospital. The educational establishments include a school of law, an ecclesiastical seminary, a Latin school, school of philosophy, and several primary schools. São Paulo

as the capital of the state, is the seat of several important courts of law and public offices, the place where the state assembly holds its sittings, the residence of the president, and the see of a bishop. It also possesses a public library, and an extensive botanical garden. Pop (1890), 64,934.

SAP, in military engineering, is the process by which trenches are cut when the workers are within range of the musketry fire of the besieged. There are two kinds of sap: the *flying sap* and the *complete sap*. In the flying sap each sapper is provided with two gabions, which, when filled with earth, are musket proof, and behind these he works, throwing the earth beyond them towards the fortress, so as to form a parapet. The gabions of each sapper being placed in line, the work is thus proceeded with until the whole is completed. In the *complete sap*, which is resorted to when proximity to the besieged renders the other method less practicable, four sappers at a time are usually employed, the foremost of them rolling a large gabion before him and excavating as he progresses, filling smaller gabions with the earth dug out, and erecting them to form a parapet. The other sappers then widen and deepen the sap, and throw more earth on the parapet. When the approach cannot be made by zigzags, and two single saps are carried on side by side directly towards the front, with a parapet on the outside of each, it is called a *double sap*.

SAP. See **BORANY**.

SAPAJOU, a general name applied to include several species of Platyrrhine or New World Monkeys belonging to the family Cebidæ. The Sapajous possess tails of feebly prehensile powers. They live in flocks in the forests of Brazil, Peru, Guiana, and Columbia, and feed on fruits, eggs, small birds, &c. They are familiar in habits, become soon domesticated, and are thus in favour amongst mountebanks, &c., who teach these monkeys to become very expert in performing tricks. Common species of Sapajous are the Sai (which see), *Cebus capucinus*, the White-throated Sapajou or Sajou (*C. hypoleucos*), &c.

SAPAN WOOD, or **BUCKUM WOOD**, the wood of the *Cassalpinia Sappan*, a middle sized tree, indigenous to Siam, Pegu, &c. It is exported in considerable quantities from Singapore and other ports of that region to Calcutta and to Europe, where it is used as dye wood. The dye it yields is of a red colour, but rather inferior.

SAP GREEN, a pigment which is prepared by mixing the juice of the ripe berries of the buckthorn (*Rhamnus catharticus*) with alum. The berries are allowed to ferment for eight days in a wooden tub. The juice being then pressed out and strained, and a little alum added, the whole is allowed to evaporate until it has obtained a proper consistency, when it is placed in pigs' bladders and hung up to harden. The colour is very fugitive, it is used by water-colour painters.

SAPINDACEÆ, in botany, a natural order of exogenous plants, composed of large trees or shrubs, sometimes of herbaceous and twining plants, bearing alternate and generally imparipinnate leaves, sometimes furnished with tendrils. Their calyx consists of four or five sepals, which are free, or slightly united at the base. The corolla, which is sometimes wanting, is generally formed of four or five petals, which are sometimes naked, sometimes glandular near the middle, where they occasionally bear a petaloid lamina. The stamens, which are double the number of petals, are free, and often inserted in a flat, lobed, hypogynous disk, which fills all the bottom of the flower. The ovary is three-celled, each cell generally containing two superimposed ovules attached to its inner angle. The style is simple at the

base, trifid at the summit, which is terminated by three stigmas. The fruit is a capsule, sometimes vesicular, with one, two, or three cells, each containing a single seed. The seeds are composed of a large embryo, having its radicle curved over the cotyledons, and destitute of endosperm. The order contains about 380 known species, all natives of warm climates. The horse chestnut, which belongs to this order, though not a native, is widely diffused in Europe. The fruits of several species are eaten, but the leaves of many are poisonous. The fruit of *Sapindus saponaria* is soapy, as its name implies, and is used for washing linen. Some species afford valuable timber. Some are also used medicinally as astringents.

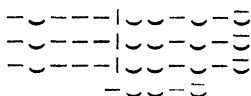
SAPOTACEÆ, in botany, a natural order of exogenous plants, consisting of trees or shrubs, all extra-European, and most of them within the tropics. Their leaves are alternate, entire, persistent, and coriaceous, flowers hermaphrodite, calyx divided, regular, persistent, corolla monopetalous, regular, with lobes equal in number to those of the calyx, seldom double or triple. The stamens are epipetalous, definite, distinct, some of them, of the same number as the lobes of the calyx, and opposite the petals, are fertile, the rest, alternate with the others, sterile. The ovary has several cells, each containing an erect ovule. The style is generally terminated by a simple, sometimes by a lobed stigma. The fruit is fleshy, with one or several monospermous, sometimes bony cells. The embryo is erect, and contained in a fleshy endosperm, which is rarely wanting. The genera of this family are *Achia*, *Mimusops*, *Sideroxylon*, *Lucuma*, &c., and there are upwards of 200 known species. It is closely allied to the Ebenaceæ, which differ from it in having their flowers generally unisexual, their stamens disposed in two series, their style divided, and their seeds pendent. One of the most important species is the *Isomandra gutta*, which produces the gutta percha of commerce. The fruits of some species contain a thick oil used for domestic purposes. Those of others, such as the star apple of the West Indies, are sweet, and used for food.

SAPPER, the designation of a private soldier in the Royal Engineers. Formerly the non-commissioned officers and privates of that corps received the general appellation of the Royal Sappers and Miners, which is now no longer used. As the duties of the sappers—the building and repairing permanent fortifications, raising field redoubts and batteries, making gabions and fascines, digging trenches (see **SAP**), and the like—require a considerable amount of mechanical skill, the men are usually of a superior class to the common soldier, they are only eligible for the service if of good character, and already adepts in a mechanical trade.

SAPPHIRE. See **CORUNDUM**.

SAPPHO, a distinguished Greek poetess, was born at Mitylene, or as some held at Eresus, on the Island of Lesbos, and flourished about 600 B.C. Her father's name was Scamandronymus, who died when she was only six years old. Alceus, like her a lyric poet, and a native of the same island, is said to have loved her, but his passion was not returned. The brilliant fame which she enjoyed seems to have subjected her to calumny, and even to persecution, on account of which she left Lesbos for Sicily, between 604 and 592. Almost nothing further is known regarding her life, though she is made the subject of various legends, the truth of which is at best very questionable. Of these may be mentioned the common story of her love for Phaon, which, being unrequited, caused her to leap down from the Leucadian Rock. Nothing in the fragments of her poems that remain

gives any hint of the existence of such a person as Phæon, and as for the leap from the Leucadian Rock it seems to be a mere metaphor taken from an expiatory rite connected with the worship of Apollo (See *LEUCADIA*). At Mitylene Sappho appears to have been the centre of a female coterie, most of the members of which were her pupils in poetry. Ancient tradition commonly represents her as a woman of abandoned character—probably with more or less truth. She was the author of various poems, hymns, odes, elegies, epigrams—of which only two complete pieces and fragments have come down to us, these display deep feeling, glowing imagination, and a high finish. She is said to have invented several meters, at least one still bears her name, and has been used by ancient and modern poets.



There is an edition of the extant fragments with translations and memoir by H. T. Wharton (1885).

SARABAND, a dance, said to be derived from the Saracens. The tune is written in $\frac{3}{4}$ or $\frac{3}{8}$ time, and consists of two parts. Its character is grave and expressive. It originated in Spain, where it was formerly danced to the castanets. Handel, Bach, and other masters, frequently wrote tunes of this description for the harpsichord or clavichord.

SARACENIC STYLE OF ARCHITECTURE See ARCHITECTURE

SARACENS (*Orientalis*), the name adopted by the Arabs after their settlement in Europe, as the term *Arabs* (people of the West), which indicated their geographical situation in Asia, was improper in Europe. At the period of the Crusades it was employed as a synonym for all infidel nations, against which crusades were preached, and in course of time it became the generic name of all the Arabian tribes who embraced Mohammedanism, and spread their conquests over the greater portion of Asia and Africa. A great variety of opinions existed regarding the etymology of the term, but the true derivation of the word is *Sharaken*, which means in Arabic 'the Eastern people,' and was corrupted into the Greek *Sarakēnoi*, whence comes the Latin *Saraceni*, and our word *Saracens*.

SARAGOSSA, or **ZARAGOZA** (anciently, *Cæsaraugusta*), a city of Spain, in Arragon, capital of the province of the same name, as well as of the ancient kingdom of Arragon, 174 miles north east of Madrid, in a fertile plain irrigated by the Ebro. This stream separates the city, which is entered by eight gates, from the suburb, and is crossed by a good stone bridge. Seen from outside, the place with its slim towers, cupolas, and spires, has an imposing character, but inside the streets are mostly tortuous lanes, ill paved, and worse lighted, and altogether the town is dull, gloomy, and old fashioned. The houses are indeed castles, being built in solid masonry, and in a highly ornamental style, but Saragossa has been abandoned by the Arragonese nobility for Madrid, and their mansions are falling into a state of dilapidation, or are let to agriculturists, who convert the noble courts into farm yards with dung heaps. Among the principal edifices are the two cathedrals, the vast archiepiscopal palace, which was gutted and plundered by the French, the remains of the Parliament house, built in 1437-40, whose magnificent saloons contained the rich national archives, an excellent library, and the portraits of the Arragonese worthies—all utterly destroyed by the invaders, the exchange, built in 1551, a square brick edifice with

projecting enriched soffit towers, covered with green and white tiles, and a noble interior, the Torre Nueva (new tower), taken down in 1892, an octagonal clock tower for the city, which leant considerably (about 9 feet) out of the perpendicular, like the towers of Pisa and Bologna, the old irregular citadel called the Aljaferia, built by the Moors, which Suchet converted into a barrack, after having damaged it with his bombs, and during the civil wars degraded into a prison. There are besides two hospitals and various other benevolent institutions, numerous churches, a town house, chamber of commerce, new university, in room of that destroyed with its precious library by the French, a normal school, academy of medicine and surgery, theological college, and various other educational establishments, numerous monastic institutions, most of them suppressed, a theatre, baths, botanic garden, a museum of pictures and sculptures, a bull ring, and beautiful promenades on all sides of the town. Agriculture constitutes the main occupation of the inhabitants, and there are several extensive manufactories of flour, several foundries, dye works, and a large salt-petre work, the other articles manufactured consist of soap, brandy, liqueurs, beer, coarse paper, bricks and tiles, sheep skins, linen and cotton stuff, silk stockings, starch, boots, blankets, &c. Some of the articles just mentioned are also imported, as well as rice, dried cod, bar iron, timber, dye stuffs. Among the articles exported are chocolate, paper, cast iron, wool, dyed silks, hats, soap, and above all, wheat and flour, the last two chiefly to Catalonia.

Saragossa was the Salduba of the Celtiberians, but when Augustus became its benefactor it was called after him, and the modern is a corruption of the Roman name. It was always a free city or *colonia immunitas*, had a mint, and was a seat of judicial assizes, but no traces of the ancient city are left except in the walls. Saragossa early renounced Paganism, and here Aulus Prudentius, the first Christian poet, was born, A.D. 348. It was captured by the Moors in the eighth century, and was wrested from them in 1118 by *Alonso el batallador*, after a siege of five years, when the stubborn population had almost all perished of hunger. Below the hill of Torero, which commands the town, General Stanhope, on the 20th of August, 1710, came up with and completely defeated Philip V. flying from his defeat at Lerida, the foe abandoning cannon, colours, and everything. In 1808 it sustained two memorable sieges. The first was raised by the defeat of the French at Bailen, but being again invested it resisted most heroically for sixty-two days attacks conducted by the four French marshals, Lannes, Mortier, Moncey, and Junot, but ultimately capitulated on February 20, 1809. These two sieges cost the lives of nearly 60,000 brave men, and for nothing, as the defence of the town was altogether a military mistake, and the result of popular impulse. Pop. (1897), 98,188.

SARAJEVO See BOSNA SERAI

SARATOGA SPRINGS, a town of the United States, New York, about 35 miles north of Albany, pleasantly situated on a sandy plain, partly surrounded by a beautiful grove of pines, and brought into communication with distant parts of the country both by lines of railway and by Lakes George and Champlain. It owes its existence and prosperity to its mineral springs, which have made it the most celebrated watering place in the United States, and for the accommodation of the summer visitors a number of splendid hotels have been erected. The springs, twenty-three in number, are characterized by their saline and chalybeate ingredients, combined with carbonic acid gas. They are not only very efficacious in many cases of inveterate disease, but have a powerful

effect in renovating the system when enfeebled by sedentary habits or over exertion, and are hence in such repute as annually to attract in the summer season upwards of 35,000 visitors. Besides the water thus used large quantities are bottled and sold in various parts of the Union. Pop (1890), 11,975.

SARATOV, a government in the south east of Russia, lat 48° to $53^{\circ} 10' N$, lon $42^{\circ} 20'$ to $51^{\circ} 30' E$, bounded north by Penza and Simbirsk, east by Samara and Astrakhan, south by Astrakhan, southwest by Don Cossacks, west and north-west by Voronez and Tambov, greatest length, north to south, about 300 miles, greatest breadth, about 230 miles, area, 32,613 square miles. The whole eastern boundary is formed by the Volga, which here flows in a S W direction. A range of heights of moderate elevation extends at a short distance from the river, and in a direction nearly parallel to it, forming the watershed between the basins of the Caspian and the Sea of Azoff. To the latter basin the far greater part of the government belongs, being drained chiefly by the Khoper and Medveditsa, affluents of the Don. The surface is generally diversified by numerous hills and low ranges, with intervening valleys, where a mild climate and good soil combine in raising heavy crops of corn, and covering large tracts with the richest pasture. The principal exports are corn, hemp, flax, tobacco, hops, and madder. In the neighbourhood of the town of Saratov the mulberry is cultivated to some extent for rearing silk worms. There is no mineral product of any consequence. The great majority of the inhabitants are Russians, with a considerable mixture of Tatars and Mordvins. Besides these, a number of colonists, consisting of Germans, French, Swiss, and Swedes, have been introduced. The first German colonists were drawn hither by Catherine II in 1763, and they now number considerably over 200,000 souls. They have greatly improved the industry of the district both by their labour and their example. For administrative purposes the government is divided into ten districts. Pop (1897), 2,419,884.

SARATOV, a town of Russia, capital of the above government, on the right bank of the Volga, 459 miles south east of Moscow, in a warm and fertile valley, inclosed by lofty and well wooded limestone hills. It consists of the town proper, surrounded by a wall and fosse and of a suburb, and having been nearly burned down in 1811 has been rebuilt in a much improved form, though most of the houses still continue to be of wood. It is the seat of several important courts and public offices, contains numerous churches, court houses, a merchant house, gymnasium with botanical garden, a museum (1885), and several handsome mansions, occupied by nobility, and has manufactures of cordage, bells, pottery, tiles, tobacco, soap, woollen cloth, cotton and silk stuffs, &c, an important trade, principally transit, by the Volga, between Moscow and Astrakhan, and a very large annual fair. Pop (1897), 137,109.

SARAWAK, an independent state in Borneo, governed by an Englishman with the title of Rajah, and now under British protection. It is situated on the western or north western side of the island, and its coast extends from Cape Datoo on the south west to Kidorong Point on the north east, having a length of about 300 miles, the inland boundary is mainly formed by the Dutch territories, while in the north east is the independent sultanate of Borneo Proper, also now under British protection, population, about 300,000. The shore is generally low and undulating, but immediately behind it the ground rises rapidly and becomes mountainous. The soil, consisting generally of black vegetable mould on strong yellow loam, is very productive, and seems peculiarly adapted to the

sugar-cane, which grows readily even without cultivation, and under the careful culture of the Chinese often attains a height of 18 feet, and abounds in saccharine juice of the richest quality. Cloves, nutmegs, and cinnamon also thrive well, but the more important vegetable productions are cocoa-nuts, rice, and sago. Metals, particularly gold, antimony, and nickel, are very abundant, and are worked to a considerable extent. Diamonds and other precious stones are also found, and excellent coal, favourably situated both for working and shipping, has been discovered. The original inhabitants are Dyaks, but are now very much intermixed with Malays and Chinese. They had made considerable progress in civilization, but owing to misgovernment and marauding expeditions for the purpose of obtaining slaves and other plunder were in a wretched condition till the late Sir James Brooke was appointed rajah. The rajahship was conferred upon Sir James by the Sultan of Borneo in return for distinguished services in quelling disturbances and restoring order. Under his mild yet vigorous administration a happy change was produced, and is extending its benefits beyond Sarawak to the adjoining territories. Sir James Brooke, who died in 1868, has been succeeded in the sovereignty of the country by his nephew, Sir Charles Brooke. The exports consist chiefly of gutta percha, sago, edible birds' nests, and antimony, of which last article 2000 tons are annually shipped to Singapore.

The seat of the government is at Sarawak (formerly called *Kuching*), on a river of the same name. It consists of a native and a European town. A six gun battery commands the reach immediately below the town, and there a number of Chinese houses have been built. Many of these houses, raised on posts, and formed of wood, have a very respectable appearance. The trade of the town is considerable, and is carried on chiefly in large boats, some of them of 100 tons, which sail annually to Singapore with sago and other productions of the coast, receiving in exchange European goods, Javanese cloths, brass work, and coarse earthenware, made in China. Many of the inhabitants are employed in the gold mines in the vicinity. Pop estimated at 25,000.

SARCINA, a microscopic fungus of the order Saccharomycetes, and of the division Protophyta of the vegetable kingdom. It consists of cubic or prismatic masses, made up generally of eight, sixteen, or sixty four rounded, cubic cells, the faces of each cell being divided into four frustules or projections by two light grooves which cut each other at right angles. Each cell has a diameter of about $\frac{1}{16}$ th to $\frac{1}{12}$ th of a line, and consists either of a completely homogeneous mass only, without nucleus or granulations, or of such a mass with four, sometimes two or three, nucleuses. The cells are separated from each other by rectangular striae. Sarcinae are found sometimes in considerable quantities in the vomitings of persons ill with chronic affections of the stomach, in the faces of chronic diarrhoea, &c, they have likewise been detected in the stomachs of rabbits, dogs, tortoises, and other animals, in the urine, in the pus of gangrenous abscesses, in the bones, &c.

The appearance of Sarcinae in vomitings indicates a particular form of dyspepsia, for which the best known remedy is that recommended by Professor Jenner, namely, sulphate of soda, of which 10 grains to 1 drachm, dissolved in water, and taken soon after a meal, will be found attended by beneficial results.

SARCODE, the name given to the primary or elementary matter (otherwise known as *Protoplasm* or *Bioplasm*) of which the bodies of all living beings, animals and plants, are composed. The lowest animals and plants are composed wholly of this sarcode.

matter, which is a compound of albuminous nature, consisting of carbon, hydrogen, oxygen, and nitrogen, in high combining proportions, together with traces of phosphorus and sulphur. It forms one of the protein compounds of Mulder. Wherever life or vitality appears this sarcode is present, and it is therefore to be viewed as the essential medium without which life cannot exist. The highest animal and plant in their earlier stages are composed simply of this matter, the process of development gradually evolving out of this primitive basis the elaborate structure of the perfect form. The community or universality of this sarcode has led some biologists to regard it as being much more intimately associated with vital actions than any mere medium for the exhibition of life could be, and hence the 'physical theory of life,' which regards vitality as an actual property of this sarcode, came to be enunciated. As discussed more fully in the article PROTOPLASM, (which see), this theory is at present untenable, and illogical in its aspects as compared with the theory of a vital force, which regards life as a force or principle distinct from the matter it invests.

SARCOPHAGUS (Greek, *sarx*, flesh, and *phagō*, I eat), originally a species of limestone, found in the neighbourhood of Assos, in Mysia, which, according to Pliny (Hist. Natur. ii. 96, and xxxvi. 17), had the power of destroying within forty days the corpses put into it, so that nothing remained entire except the teeth. Hence the name. This quality brought the stone into use for coffins, and thus the name came to be applied to all coffins of stone, though often used for a contrary purpose to that which the name expresses. The most ancient sarcophagi are those of Egypt, some of which are as old as the pyramids. The earlier ones were cut in the shape of square chests, and when not perfectly plain were ornamented with two lotus leaves. The later ones were of various forms, the most usual being that of an Egyptian mummy swathed. The material of which the latter were commonly made was red granite, and the coffins were ornamented with mythic scenes and inscriptions. The most remarkable of the Egyptian sarcophagi are the oriental alabaster one of Seti I. in the Sèvres Museum, that of Ramses III. in the Louvre, and that of Nectanebes I. in the British Museum. Recent discoveries have shown that the Phœnician kings were buried in sarcophagi of basalt or alabaster, mummy shaped, but differently ornamented from those of the Egyptians. Of these the most remarkable is that of Eschmunazar, king of Sidon, bearing a long inscription in Phœnician, and supposed to be of date 574 B.C. A sarcophagus of one of the kings of Judah, in the form of a rectangular chest, is to be seen in the Louvre. A number of sarcophagi have been found in Greece, but they mostly belong to the first centuries of the Christian era. Etruscan sarcophagi of the fourth century B.C. are made of alabaster, terra cotta, or peperino, and richly decorated with reliefs representing mythical subjects. Those of the Romans, in the days of the republic, were plain chests with little or no ornament, but under the empire it was the custom to have them richly ornamented after the manner of the Etruscans. Of sarcophagi displaying Christian art two remarkable ones of red porphyry are at present in the Vatican—those of St. Constantia and St. Helena. The practice of using stone chests in the burial of distinguished persons is to some extent continued to the present day.

SARD, or **SARDON**, a variety of carnelian, which exhibits by reflected light a dull reddish brown colour, but by transmitted light appears of a rich blood-red colour.

SARDANAPALUS (Assyrian, *Asur-bani-pal*, Asur is the creator of a son'), a great king of

Assyria in the seventh century B.C. He was the eldest son of Esarhaddon, grandson of Sennacherib, and great-grandson of Sargon, and succeeded to the throne in 688 B.C. His first campaign was against Egypt, where Tirhakah of Ethiopia had made himself master and overthrown Esarhaddon's system of princes tributary to Assyria. Tirhakah, defeated in a battle in the north east, fled from Memphis, pursued by the Assyrians in boats up the Nile, and retired altogether from Egypt. His successor Urdamane occupied Upper Egypt for a time, but he was defeated and driven south, and an immense amount of booty was taken from Thebes by the Assyrians. Asur-bani-pal afterwards besieged Tyre, but failed to take it, though a strict blockade induced the ruler to come to terms and pay tribute. The kings of Arvad, Cilicia, and Tabal were also put in subjection, and Gyges of Lydia sent in his submission, though later he assisted Psammeticus in throwing off the Assyrian yoke in Egypt. Urtaku, king of Elam, to the east of the Tigris, advanced against Babylonia, but was driven back by Asur-bani-pal. On Urtaku's death his sons, whose lives were in danger from Teumman, the usurping successor, sought the protection of Assyria, and war with Elam again broke out, with the result that Asur gained a great victory near Susa, captured and beheaded Teumman, and placed Urtaku's sons over the kingdom as his vassals. Not long after, Asur's brother Samas-um-ukin, who ruled Babylonia as a vassal king, revolted and was joined by the Elamites, Arabians, Ethiopians, Egyptians, Chaldeans, and others. Asur-bani-pal defeated the strong combination, and then laid siege to the four towns, Babylon, Borsippa, Sippara, and Cutha, in which the leaders of the revolt took refuge. His brother avoided capture by burning his palace around him. His next great campaign was against Elam and its king Ummanaldas II, and on this occasion he followed up his victory by looting Susa and razing it to the ground. His last military exploits were some successful struggles with Arabian forces, and he had a triumphal procession through Nineveh to celebrate his victories. He is supposed to have died in 625 B.C., but the latter part of his reign is obscure. He was not the mere sensualist of the classical accounts, though doubtless sensual enough. The remains of his splendid palace, with its priceless library, have been excavated at Kuyunjik. His name appears in Ezra iv. 10 as Sanapper (RV Sanapper).

SARDES, or **SARDIS**, the ancient capital of Lydia, on the river Pactolus, not far from the mount Tmolus. Under the Persians it was a magnificent city, and a great market for slaves, on the commercial route from Asia to Europe. The Greeks conquered and burned it 500 B.C. An earthquake again destroyed it, but Tiberius rebuilt it. Sardis was the seat of one of the seven churches of the Apocalypse. A small village stands at present on its site, and considerable ruins still attest its ancient grandeur.

SARDICA, an ancient town in Lower Dacia, on the site of the modern Bulgarian town of Sofia or Sophia. The Emperor Galerius was born in its vicinity, but the town is chiefly celebrated as the place where an ecclesiastical council was held in 347, at which Athanasius defended himself against the Arians and the prelates of the East. As the latter were outnumbered by those of the West, the supporters of Athanasius, they retired to Philippopolis, and formed a separate synod. According to Gibbon this council reveals the first symptoms of discord and schism between the Greek and Latin Churches.

SARDINE (*Clupea sardina*), a species of Teleostean fishes, included in the Herring family (Clu-

peidae), and closely resembling the Pilchard (which see) in form. It is, however, of smaller size than that familiar fish, and takes the place of the herring in the Mediterranean Sea, off the Sardinian coast, and on the coasts of France, as, for example, on the Brittany sea-board. The flesh is considered extremely delicate, and is prepared for consumpt in a variety of ways. The process and trade of curing the sardines is carried on briskly at Concarneau, at which port 13,000 men are engaged in the fishery, and also at Douarnenez. Large quantities of these fishes appear to be sold in the fresh state, whilst still larger quantities, preserved in a manner about to be noticed, are exported, packed in the familiar tins. About 4,000,000 boxes of sardines are said to be cured and preserved in oil for French consumpt alone. The fishes, when bought for curing, are first beheaded and then gutted, and sorted according to their sizes. They are then washed, to cleanse them, in sea water, by women, who are said to earn at this work from 12 to 20 francs per week. The fishes are next dried by being suspended on nets or willows in the open air, and they are then plunged into a cauldron of the purest olive-oil, which is kept boiling over a furnace. The sardines are laid in the cauldron on wire gratings, two rows deep, and are kept therein until sufficiently cooked, when they are taken out and allowed to drip, the oil-drippings being carefully collected. They are now packed in the tin cases, which are filled with oil, and sealed hermetically. It is said that the men whose duty it is to solder the lids on the boxes earn large wages, but that they have to buy all the fish that may be spoiled through carelessness or even inadvertence in the sealing process. After being sealed the tins of sardines are boiled in a steam-chest, and the efficacy of the sealing is tested by the fact that those tins which have been imperfectly closed do not bulge out as they ought to do when hermetically sealed. The offal and waste of the sardine-curing industry is sold as valuable manure to the farmers. The meshes of the sardine nets are of peculiar conformation, and are adapted to securely retain these small fishes, and the fishermen in some places also throw into the sea a kind of bait prepared from the eggs of the cod, with the view of attracting the sardines to the spot. Pilchards are now often prepared like sardines, and some authorities maintain that the two fishes belong to one and the same species. Young herrings are so prepared in the Baltic.

SARDINIA, ISLAND OF (Italian, *Sardegna*), the largest island in the Mediterranean Sea after Sicily, and before the formation of the Kingdom of Italy, forming with its surrounding islands, the principal of which are San Antioco, San Pietro, Asinara, Madalena, Tavolara, and Caprera, that part of the Sardinian States named the Kingdom of Sardinia. It extends from lat $38^{\circ} 50'$ to $41^{\circ} 15' N$, lon $8^{\circ} 5'$ to $9^{\circ} 50' E$, greatest length, from Cape Teulada in the south to Longo Sardo in the north, 152 miles, central breadth, about 66 miles, area, including the small islands along the coast, 9350 square miles. It is divided into two provinces, Cagliari and Sassari—the former comprising the districts of Cagliari, Iglesias, Oristano, and Lanusei, and the latter those of Nuoro, Alghero, Ozieri, Sassari, and Tempio. Total population in 1901, 789,314. It is nearly in the form of a parallelogram, and though not without considerable indentations, especially on the southern and western coasts, is very compact. On the north it is separated from the Island of Corsica by the Strait of Bonifacio, not quite 7 miles wide. The opinion of geologists, founded on the similarity and general appearance of the strata on the opposite coasts, is that the two islands were originally one, and that a subsidence in the strata formed the channel which

now flows between them. This view is confirmed by the number of islands which lie in the eastern part of the channel, and form a kind of connecting links by which the continuity of the two islands is still rendered almost visible.

Coasts—The north coast is generally rugged and precipitous, presenting a succession of bold headlands, of which those of Testa Grossa, near the Bay of Santa Reparata, and Falcone, are the most conspicuous. The principal bay is that of Porto Torres, in the Gulf of Asinara, having a low beach, with lagoons extending along its eastern and southern shores, but rising towards the west into precipitous cliffs, terminating on the mainland in Cape Falcone, and thereafter continued north in the long and rugged island of Asinara. The west coast, stretching south from Cape Falcone, continues steep and rugged, and presents, among other remarkable headlands, that of Cape Argentiera, forming the extremity of a rocky mountain upwards of 2000 feet in height, but beyond this, after passing the bold and picturesque cliffs of Monte Ghiscera, the coast turns suddenly east, and forms the Bay of Alghero, where a remarkable change takes place, and the beach becomes lined with hills of fine white sand. To the south of Alghero the sand disappears, and a range of gentle hills, planted with vineyards, lines the shores as far as Poglina, when the coast again resumes its rocky character, presenting a succession of trap cliffs, which extend to Cape Marargu, and thence to Point Mova, near the town of Bosa. A kind of table land succeeds, and is continued, though with occasional interruptions, as far as Cape Mannu, conspicuous by the round tower on its tabled cliff of moderate height. The beach now lowers, and trending east, forms the large and nearly semicircular expanse of the Bay of Oristano, the northern and southern extremities of which, Capes San Marco and La Frasca, are above 5 miles apart. The shore around this bay consists of a low alluvial tract, bounding a succession of large lagoons. Rocks again appear towards Cape La Frasca, and continue with little interruption to Cape Pecora, from which the coast trends along the base of Monte Ferru to Point Rama, where a remarkable conical rock, called Pan di Zucchero, comes into view. A large open bay, called Porto Paglia, succeeds, and beyond it the coasts become lined by a group of islands, of which St Pietro and St Antioco form, with their opposite coasts, a spacious harbour, with safe anchorage in every wind. Between the east coast of Antioco and the mainland is the Gulf of Palmas, the northern shore of which consists of a succession of flat islets, which often join at low water, while its southern extremity, after presenting the bare and sloping promontory of Point Piombo, terminates in the still more remarkable headland of Cape Teulada, which consists of a long range of precipitous cliffs, nearly 900 feet high, running out into the sea, with a breadth of little more than $\frac{1}{2}$ mile, and forming the most southerly point of the whole island. A bay of the same name opens between this headland and Cape Spartivento. The shore is in some parts flat, but in others runs along the base of rugged granite mountains, and particularly towards the east has a barren and desarted appearance. Turning north from Cape Spartivento a number of rocky islets present themselves, lining a low and marshy beach, which continues almost unbroken till the Island of San Macario is reached, forming the south-west entrance of the Gulf of Cagliari. This gulf, extending from Cape Pula on the west to Cape Carbonara on the east, a distance of about 24 miles, and stretching inland for nearly 12 miles, is in many respects the most important of the island. Besides having the capital situated on its northern shore, it everywhere furnishes excellent anchorage

in ample depth, and in the grounds along and behind it exhibits the best specimens of cultivation of which Sardinia can boast. The east coast, from Cape Carbonara northwards, stretches nearly in a straight line, the continuity of which is seldom interrupted by indentations. The only bays deserving of notice are those of Orsoi and Terranova. The coast line presents similar features to those which have already been described, low beaches and rocky cliffs often succeeding each other within very short distances. The most conspicuous of all the headlands is that of Monte Santo, a rugged promontory upwards of 2400 feet high, sloping towards the sea, and terminating in bold precipices of limestone, within which is an extensive cave fantastically adorned with enormous milk white stalactites.

Mountains and Streams—The interior is generally mountainous, the great chain which traverses Corsica from north to south being evidently, notwithstanding the interruption of the Strait of Bonifacio, continued into Sardinia, where it usually follows the same direction, but occasionally sends out transverse branches east to west. The culminating point of these mountains is the peak of Genargente, which is situated a little to the east of the centre of the island, and attains the height of 6132 feet. The next highest summit is the peak of Limbarra, 4330 feet, belonging to the transverse range of that name, and situated in the north. Several other summits reach from 3000 to 4000 feet. Between the mountain ridges are several extensive plains, of which the most celebrated for beauty and fertility are those of the Campidano in the south, stretching between Cagliari and Oristano, and of Ozieri in the north. Besides these there are several large sandy or stony districts called *macchie*, of a very sterile nature. The streams are numerous, and add considerably to the fertility of the districts through which they pass, but are of no navigable importance. The Tirso, the largest, pours its waters into the Gulf of Oristano on the west coast. Next to it are the Cogonnes, which flows north west into the Gulf of Porto Torres or Asinara. The Flumendosa, which pursues the earlier part of its course between two mountain ridges, turns south east, and discharges itself on the east coast, and the Mannu, which falls into the Gulf of Cagliari. The lakes are situated chiefly in the vicinity of the coast, where they form a series of lagoons.

Geology—In regard to geological structure the far greater part of the rocks are of crystalline texture, and belong to the earliest formations, consisting of granite overlain by gneiss and mica schist. These rocks extend without interruption over the whole of the north-east and east sides of the island, and after disappearing beneath an irregular belt of sedimentary rocks of the Silurian system again rise to the surface and occupy considerable tracts both in the south east and south. Trachyte, basalt, and other rocks of volcanic formation are most largely developed in the north-west, but also occupy a great number of isolated spots throughout the island, and more especially in the south west, where the adjacent islands of St Pietro and St Antioco are almost entirely composed of them. In many cases the mouths of ancient craters and the lava streams issuing from them can be distinctly traced. Besides the sedimentary Silurian rocks already mentioned as breaking the continuity of the granite on the east a large tract in the south west belongs to the same formation, appearing on the west coast, both to the north and south of Cape Pecora, extending considerably inland past the town of Iglesias, and then curving round in a south-south-west direction till it reaches the southern extremity of the island and forms the remarkable promontory of

Toulada. The limestones and chalks at the top of the secondary formation are not largely developed, but occupy a number of isolated tracts both in the interior and on the coast. In the latter portion they form conspicuous objects in the north-west, where the cliffs to the north of the Gulf of Alghero are composed of them, and in the east, where they form the great mass of Monte Santo, and contain its celebrated stalactical cave. Tertiary rocks of travertine, marl, and sandstone occupy a considerable tract near the town, and along the Gulf of Sassari, and also in the south, where they form the eastern boundary of the plain of Campidano. That plain itself, however, has a deep covering of alluvium, which partly accounts for its remarkable fertility. Similar tracts of alluvium, though of much more limited extent, are found in the Plain of Ozieri in the north, and along the Gulf of Palmas in the south, and that of Paglia in the south-west.

Minerals—The mineral riches of the island were well known to the ancients, whose extensive workings can still be traced. Tradition enumerates gold among its metals, but no traces of it can now be found. Lead, however, exists in considerable abundance, and is generally highly argentiferous. Mines of it are profusely scattered over various districts. Zinc ore (calamine) is worked, and as well as lead ore is exported. Copper occurs in several quarters, and occasionally furnishes beautiful specimens of malachite. Quicksilver has been found, and was once partially worked, and both bismuth and antimony are said to exist, iron of excellent quality is plentifully distributed, and is worked in several districts. The other mineral products deserving of notice are porphyry, basalt, alabaster, marble, volcanic enamels, rock crystals, and a variety of beautiful pebbles, lignite, gypsum, and nitre. Salt, in its mineral form, has only been found in the grottoes of Serrenti, but is extensively obtained from the salt pans along the coast, and forms one of the most profitable sources of royal revenue, for the sake of which it is strictly maintained as a government monopoly.

Climate—The climate of Sardinia has for many ages borne a very bad name, and though the cause cannot be easily ascertained, there can be no doubt as to the fact that at certain seasons large districts become so insalubrious as to be regularly deserted by their inhabitants, while in others the mortality is remarkably great. The range of the thermometer is between 34° and 90°, and the mean annual temperature 61° 7'. Hence neither heat nor cold can be said to be in excess. During the hot season, in the low lying lands, miasmata are continually arising to taint the air, the malignant properties of which become so virulent at night or in the cool of the evening that the natives never quit their homes until an hour after sunrise, and hasten to return before sunset, carefully closing every door and window. The disease which then prevails is known by the name of *intemperu*, and is said to be even more fatal than the *malaria* by which parts of Italy and Sicily are infested.

Vegetation, Cultivation, &c—The whole surface of Sardinia has been divided into three portions—one occupied by mountains, which, where not absolutely barren, are covered with forests or clothed with pasture, one occupied by marshes, lagoons, and the almost sterile *macchie*, and one under tolerably regular culture, as arable land, olive yard, vineyard, &c. Much of this land is of very remarkable fertility, and though, from the very imperfect system of agriculture pursued, the average produce does not exceed 1 in 7 or 8, a return of 15 to 20 in some favoured districts is not uncommon. The grain thus raised considerably exceeds the consumption of the present inhabi-

tants, and might easily be increased so as to supply three times the number. The whole operations of the farm are conducted in the most antiquated and slovenly manner. The plough, a rude instrument without a coulter, and frequently devoid of any iron appendage, merely scratches the ground to the depth of 2 or 3 inches, and the corn, first thrashed on the ground by the tread of mares and colts on a spot called *argiolo*, prepared by paring the sward and beating smooth with a mallet, is winnowed by being thrown up into the air. The principal crop is wheat, which is generally of excellent quality, and forms an important article of export in the form not only of grain but of flour, biscuit, and maccheroni. The culture of barley is more limited, and the quality of the produce is comparatively inferior, maize thrives well, and though not yet a general crop is rising rapidly into favour, beans and pease are extensively grown both for home consumption and export. The vine is well adapted both to the climate and the soil. The produce, however, is more remarkable for its quantity than its quality, all the preparatory processes being conducted in a careless and imperfect manner. The most esteemed wines are those of the Campidano, Alghero, Sorso, and Oliastro. Beautiful and extensive olive grounds are met with in various quarters, but the culture might easily be extended and made much more profitable than it has yet proved to be. The best oil is that of Sassari. The only other crops deserving of notice are tobacco, which is grown to some extent in several districts, but particularly around Sassari, Alghero, and the adjacent villages, linseed, which is produced in the greatest abundance in the neighbourhood of Oristano, cotton, for which the soil and climate of the Campidano appear well adapted, madder, which grows wild in many parts of the island, and, though neglected, might easily be cultivated to great advantage, and silk, well fitted to become a staple product, but at present produced chiefly for amusement.

Zoology—Game of all kinds is very abundant. Wild boars, stags, deer, and muffs frequent the woods and forests, and foxes, hares, and rabbits are so numerous that their skins furnish a considerable article of export. From the extent of sea coast the fisheries naturally form an important branch of industry, but the sluggishness of the Sardinians has allowed the management of them to fall almost entirely into the hands of strangers. The most valuable fishery is that of the tunny, which is carried on extensively on various parts of the coast. Anchovies and sardines, the latter at one time so numerous as to have derived their name from the island, have become comparatively scarce. Fine mullet, bream, eels, and other fish abound, and are staple articles of consumption and commerce. The coral fisheries, more celebrated in ancient than in modern times, are still carried on on the western and southern coasts, where they employ from 200 to 300 boats, which arrive annually from Naples and Genoa. The *Pinna nobilis* also, the inhabitant of a shell of from 15 inches to 27 inches in length, abounds in the smooth water of shallow bays, as at Porto-Conte and Liscia, and becomes the object of an important fishery, partly on account of the pearls, generally of very indifferent quality, obtained from it, and still more on account of its byssus, or tuft of silky hair, which is about 8 inches long, and is spun into gloves, stockings, or other articles of dress.

Manufactures and Trade—Manufactures have made very little progress, and are chiefly confined to a few coarse tissues woven by the women at their homes for private use. Tobacco and gunpowder, both, like salt, government monopolies, are manufactured to a considerable extent. The trade consists

of the exports of raw produce, the greater part of which have already been enumerated, including corn, wine, brandy, timber, seeds, fish, cattle, lead ore, calamine, salt, tobacco, &c., the imports include all the ordinary tissues, more especially cotton, colonial produce, hosiery, hardware and metals, hemp and cordage, &c. One great obstacle to the progress of trade was the miserable state of the roads, which long continued impracticable for wheel carriages. This has been to some extent removed by the formation of a good road, which traverses the island throughout its whole length from Cagliari to Sassari, and of several branch roads to the most important places not on the direct line. Several railways have also been constructed. The coinage, weights, and measures are the same now as those on the mainland.

Government, People, and History—Sardinia, until 1848, was governed by a viceroy. It is now governed in the same manner as the provinces on the mainland. The inhabitants resemble the Spaniards rather than the Italians in character. Their demeanour is grave and dignified compared with the vivacity of the Italians, and they are characterized by their unwavering fidelity to their sovereign, their chivalric sense of honour, and their hospitality. They have suffered much, however, from long neglect and misgovernment, are both ignorant and bigoted, and when they have received an injury are insatiable in their thirst of revenge, the celebrated blood-feuds being still by no means uncommon. With the exception of the inhabitants of Cagliari and Sassari, the two chief towns of the island, the Sardinians have as yet been little influenced by the modern advances of civilization, and in some remote districts the traveller may imagine himself transferred to a period several centuries earlier. The language consists of a number of dialects differing widely in many of their roots, several of them closely resembling Spanish. It is estimated that only about eighty in the thousand of the inhabitants are able to read and write, so defective is the state of education. The early history of the island is involved in much obscurity. Its original inhabitants, according to Cicero of Libyo Phœnician, and according to Strabo of Tyrrhene extraction, were living independent when, about B.C. 530, they were attacked by the Carthaginians, and obliged, after a valiant but ineffectual resistance, to quit the low country and retire into their mountain fastnesses. During the first Punic war the Romans made strenuous exertions to become masters of the island, and ultimately, on agreeing to make peace, obtained a formal session of it from the Carthaginians. This session appears to have left a rankling feeling in the breasts of the latter, and is expressly mentioned by Livy as one of the causes which led to the second Punic war, in which Rome, though finally victorious, was brought to the brink of ruin by Hannibal. During the struggles between Rome and Carthage Sardinia often became the theatre of war, and suffered equally from both the powerful states which contended for its possession. At a very early period the inhabitants were converted to Christianity, and were in course of time brought into close connection with the Papal see, which, having once fixed its hold, has never relinquished it. In civil affairs they were not more fortunate, and passed successively into the hands of the Vandals, the Goths, the Longobards, and Saracens. By the united efforts of the Genoese and Pisans the Saracens were ultimately expelled from the island, and then rival claims were set up for it by its liberators themselves. During the disputes that ensued some of the judges or governors succeeded in establishing themselves as independent princes. In 1297 Boniface VIII. invested the Kings of Arragon with Sardinia, and it continued in the possession of Spain till 1708, when it was taken

possession of by the British. In 1713, in terms of the Peace of Utrecht, it was yielded to Austria. In 1720 it was ceded by Austria to Victor Amadeus II, duke of Savoy, in exchange for Sicily. The Duke of Savoy thereafter assumed the title of King of Sardinia, which was finally exchanged in 1861 for that of King of Italy.

SARDINIAN MONARCHY, a former kingdom of the south of Europe, composed of the Island of Sardinia and of several countries of the Continent. Previous to the annexations to its territories consequent on the events of 1859, and the disjunction from it of the Duchy of Savoy and the county of Nice, which, in the same year, were ceded to and now form part of France, it comprised in the whole an extent of 28,229 square miles, with a population in 1858 of 5,194,807. The continental parts of which the Sardinian monarchy was composed were as follows—The Duchy of Savoy, the Principality of Piedmont, the county of Nice or Nizza, the Duchy of Genoa, the Island of Sardinia, and parts of the Duchies of Montferrat and Milan. These were divided for administrative purposes into eleven divisions—Turin, Genoa, Chambéry, Alessandria, Coni, Novara, Nice, Annecy, Ivrea, Savona, and Vercelli. In 1860 the revenue was estimated at 149,343,441 francs or £5,973,737, and the expenditure at 157,805,376 francs or £6,312,215. The national debt on January 1, 1858, amounted to 677,020,228 francs or £27,080,809. The army in 1859 numbered 76,172 men, exclusive of the reserve, and the fleet consisted of twenty-nine ships with 436 guns. A new constitution was voluntarily granted by Charles Albert in 1848. It appointed two legislative chambers, guaranteed the freedom of the press, and introduced many important reforms. The Roman Catholic was the religion of the state, but all other forms were tolerated. The last Sardinian king was Victor Emmanuel II, afterwards king of Italy, who succeeded to the throne in 1849. The royal title was King of Sardinia, Cyprus, and Jerusalem, and Duke of Savoy. The crown prince was styled Prince of Piedmont.

History—The country which formed the Sardinian States was known in ancient times in its southern part by the name of Liguria, and in its northern part, bounded on the north by the Pennine, and on the west by the Graian and Cottian Alps, by the name of Gallia Cisalpina. Savoy, separated from the other parts, and lying beyond the Alps, was considered as belonging to Gallia Narbonensis. To this remote corner of the territory belongs the honour of having established the present monarchy. Much obscurity, however, hangs over the origin of the house of Savoy. Its records cannot be considered authentic before the middle of the eleventh century, when Humbert, count of Maurienne, a great vassal of Rudolf III of Burgundy, appears exercising jurisdiction not only over Maurienne, but various other parts of Savoy, the Lower Valais, and Aosta. This jurisdiction was extended to the banks of the Po by Humbert's son Otho, who died in 1060, leaving two sons, who became successively counts of Savoy. The younger, Amadeus II, was succeeded by Humbert III in 1091. Under him the fortunes of his house suffered a temporary eclipse, and several great towns, including Turin, Asti, and others, threw off their allegiance. His successor, Amadeus III, recovered the greater part of what had been lost, but a long series of changes followed, during which the house of Savoy was sometimes brought to the very verge of destruction, and at other times attained to such prosperity as to excite the jealousies or fears of neighbouring states. One of the counts, called Peter, ruled from 1263 to 1268. He added the canton of Vaud to his dominions, and in many ways improved the fortunes of

his house. He is not unknown to English history, having, in 1241, before his succession, paid a visit to Henry III of England, who had married his sister. Henry made him Earl of Richmond, and gave him for residence a palace on the banks of the Thames, which hence took the name of Savoy House. Among Peter's successors the most distinguished are Amadeus V, whose prosperous rule, from 1284 to 1323, procured him the title of Great, Aymon, who succeeded in 1329, to the exclusion of his niece, in virtue of the Salic law, then first declared to be in force in Savoy, and in succession Amadeus VI, VII and VIII, all of whom ruled prosperously. Amadeus VIII, in particular, at the termination of his long reign of forty-nine years, in 1440, left his successor in possession of territories which gave him a distinguished place among the sovereigns of Europe. Being, however, interposed between France and Germany, they have too often been made the battle-field on which these great countries met to decide their quarrels. But notwithstanding this disadvantage, the house of Savoy, at the Peace of the Pyrenees in 1659, by which the wars of the French and Spanish monarchies were terminated, after they had raged for nearly eighty years, found itself under Charles Emmanuel II as great and prosperous as ever. He was succeeded in 1675 by Victor Amadeus II, during whose reign war between France and Germany again broke out. Amadeus became almost necessarily involved, but played his part so ably, that at the Peace of Utrecht in 1713 he not only added considerably to his continental possessions, but obtained possession and was formally crowned King of Sicily. By a subsequent arrangement he exchanged Sicily for the Island of Sardinia, from which he and his successors took the title of king. On his death in 1730 he was succeeded by Emmanuel III, who, became involved in the war of the Spanish Succession, and saw his territories laid waste by contending armies. The Peace of Aix la Chapelle compensated him by the addition of several important districts, and his own enlightened administration added greatly to the internal resources of his kingdom. He was succeeded in 1773 by his son Victor Amadeus III, who reigned till the French revolution broke out, and was succeeded in 1796 by his son Emmanuel IV, who, after seeing his continental dominions overrun by the armies of the French, took refuge in the Island of Sardinia in 1799, and three years after abdicated in favour of his brother Victor Emmanuel, who remained in Sardinia till 1814, when he again fixed the seat of government at Turin. Shortly after the Congress of Vienna added Genoa to his territories. An insurrection led to his abdication in 1821 in favour of his brother, Charles Felix, whose reign of ten years was marked by some important internal improvements. Having left no male issue, a collateral branch succeeded in the person of Charles Albert, who promulgated the liberal constitution of 1848, the provisions of which are referred to above. The same year saw him at the head of a league intended to expel the Austrians from Italy. The disastrous results led to his abdication in March, 1849, in favour of his son Victor Emmanuel II, and very probably to his death in July thereafter. Under the government of Victor Emmanuel the cause of progress and liberal institutions steadily advanced, some of the more important of the reforming measures being the establishment of universal toleration in religious matters, the suppression, with a few exceptions, of the monastic houses, and an unfettered freedom accorded to the press in the discussion of political matters. Such a development of liberal principles naturally proved extremely distasteful to Austria, whose arbitrary sway, exercised over the adjoining

Kingdoms of Lombardy and Venice, presented so marked and glaring a contrast. Frequent aggressive attempts were made by her, and pretexts sought for provoking hostilities with Sardinia, but the flame only burst out finally in 1859, when, in the month of April of that year, the Sardinian territories were invaded by an Austrian army. The war which then ensued ultimately issued in the establishment of the present Kingdom of Italy, into which the Sardinian States have all been incorporated, with the exception of the Duchy of Savoy and county of Nice, which King Victor Emmanuel was obliged, as before mentioned, to cede to France. See ITALY.

SARDIS. See **SARDIS**.

SARDONYX, onyx in which layers of sard and chalcedony alternate. See **ONYX** and **CHALCEDONY**.
SARGASSO SEA, **SARGASSUM**. See **GULF-WEED** and **CURRENTS**.

SARGENT, EPES, American poet and dramatist, was born at Gloucester, Massachusetts, on Sept 27, 1813, and studied at Harvard University. He was for a time connected with various newspapers in Boston and New York, and in 1836 he began to write for the stage. His plays include the *Bride of Genoa*, *Change makes Change*, *Velasco*, and *The Priestess*. A volume of poems entitled *Songs of the Sea* appeared in 1847, and was followed by *Poems* (1858), *The Woman who Dared* (1869), and other verses, including *A Life on the Ocean Wave*. He also wrote novels and stories, among them *Wealth and Worth* (1840), *What's to be Done, or The Will and the Way* (1841), *Fleetwood, or the Stain of a Birth* (1845), and *Peculiar*. *A Tale of the Great Transition* (1863). His remaining works comprise *Life and Services of Henry Clay* (1843), *American Adventure by Land and Sea* (1847), *The Critic Criticised* (1856), *Arctic Adventures by Sea and Land* (1857), *Original Dialogues* (1861), *Cyclopedia of English and American Poetry* (1883), and editions of the works of Franklin, Horace and James Smith, and many other writers. He died in Boston on Dec 31, 1880.

SARGON, a king of Assyria, successor of Shalmaneser, reigned from 722 to 705 B.C. See **ASSYRIA**.

SARI, a town in Persia, former capital of the province of Mazanderan, 20 miles east of Barfrush and 15 miles from the shore of the Caspian. According to tradition it is a place of great antiquity, but is now of far less importance than formerly, its population having greatly decreased. The environs are fertile and well cultivated. A bridge of seventeen arches here crosses the T. J. Rud, and the town is intersected by the great causeway of Shah Abbas. A considerable trade is carried on with the interior of Persia and Russia. Pop. about 8000.

SARK, **SERQ**, or **GER**, an island in the English Channel, situated off the French coast, 7 miles east of Guernsey and 13 north west of Jersey. It is about $3\frac{1}{2}$ miles in length and $1\frac{1}{2}$ in extreme breadth, surrounded by inaccessible rocks, except in one or two places, where a landing may be effected. The chief landing place or harbour is on the east coast, and here a tunnel has been constructed through the cliff to the interior. The island consists of two portions, Great Sark and Little Sark, the latter to the south of the former, and connected with it by a high and rocky isthmus, called the *Coupée*, narrowing to the width of only a few yards. On the west is the small islet of Brecqhou. The scenery of Sark is interesting and picturesque, and round the coast are numerous romantic caves. There are some remains of a convent dedicated to St Magloire, bishop of Dol, who converted the inhabitants to Christianity in the sixth century. It is well watered, the climate is healthy, and the soil is productive. The island

VOL. XII.

abounds with rabbits, wild fowl, and in the breeding season with rock pigeons. The only manufactures are knit stockings, gloves, and Guernsey jackets. The inhabitants are chiefly engaged in fishing, while agriculture is carried on to some extent. Sark is administered as a dependency of Guernsey. The islands of Alderney, Jethou, and Herm also belong to this group, which forms one of the two bailiwicks of the Channel Islands. The pop. of Sark in 1891 was 570, in 1901, 506.

SARMATIANS, a nomadic race, probably of Median descent, which inhabited Europe from the Vistula to the Volga and the Caucasus. They were subdued by the Goths in the fourth century A.D., and ceased to exist as a separate people. They were a warlike people, and were skilled horsemen.

SARNEN, a town in Switzerland, capital of the canton of Unterwalden, on a lake of the same name, where the Aa issues from it, 11 miles S.W. of Lucerne. It has a large and handsome parish church, a Capuchin monastery, burned down in 1895, and an arsenal on the site of an ancient castle, which figures in the history of Swiss independence, having been one of the first places of which the confederates gained possession. Pop. 4000.

SARNIA, a town of Canada, capital of Lambton county, Ontario, on the left bank of the St. Clair river, near where it issues from Lake Huron, 160 miles south west of Toronto. It is connected with Port Huron in Michigan by a tunnel, 6025 feet long, under the St. Clair river. The walls of the tunnel are of cast iron segments bolted together, and the approaches are more than a mile long. It is a steadily growing town, and already carries on considerable trade and manufactures. Pop. (1891), 6692, (1901), 8176.

SARNO, a town of Southern Italy, in the province of Salerno, at the foot of the Apennines, near the source of a river of the same name, 12 miles N.W. of Salerno. It is well built, and has a handsome cathedral with some fine paintings, a collegiate church, mineral springs, &c. There is a trade in excellent silk produced in the vicinity. Pop. 15,000.

SARONIC GULF (*Sinus Saronicus*), the ancient name of the Gulf of Ægina.

SARPEDON, in Greek myth, son of Zeus and Europa, having been expelled by his brother Minos, conducted a colony to Lycia, and there founded a kingdom. Zeus granted him three human lives.—Another **SARPEDON**, grandson of the former, and son of Zeus and Laodamia, or of Evander and Deidameia, was King of the Lycians and an ally of the Trojans. He was slain by Patroclus.

SARPEDON (*Papilio Sarpedon*), a beautiful butterfly found in Asia, Australia, and the Sandwich Islands. The ground colour on the upper side is brown, tinged with chestnut. A band of bright green runs in an oblique manner across the wings, and exhibits beautiful iridescent hues, whilst crescentic marks of the same colour fringe the hinder wings. The under surface exhibits a pale green band corresponding to that on the upper parts, and the hinder wings are marked below by crimson streaks.

SARPI, **PETRO**. See **PAUL OF VENICE**.

SARRACENIA, **SIDE SADDLE FLOWER**. The natural order *Sarracenaceæ*, bog plants with hollow pitcher form or trumpet shaped leaves, comprises one plant in the mountains of Guiana, another (*Darlingtonia*) in California, and the genus *Sarracenia*, having two species, found in the Atlantic United States. The *Sarracenia* or *Side saddle Flower* was named by Tournefort in honour of Dr. Sarrasin of Quebec, who first sent the plant, with a botanical description of it, to Europe. The generic characters are the following.—Sepals 5, with 3 bractlets, coloured, petals

5, oblong or obovate, incurved, stamens numerous, hypogynous, ovary compound, 5-celled, globose, crowned with a short style, which is expanded at the summit into a broad and petal like, 5-angled, 5 rayed, umbrella shaped body, capsule 5 celled *S. purpurea*, which grows in peat bogs from New England to Minnesota, North Illinois, and southward east of the Alleghamies, has pitcher shaped leaves, deep purple flower, and fiddle shaped petals arched over the greenish yellow style. The curious leaves are usually half-filled with water containing drowned insects, the inner face of the hood is clothed with stiff bristles pointing downward. Flower globose, nodding, on a scape 1 foot high. Professor Asa Gray, whose description we follow, remarks that it is difficult to fancy any resemblance between its shape and a side saddle, but it is not very unlike a pillion. The other species, *S. flava*, is confined to the Southern States.

SARSAPARILLA The roots of several species of *Smilax* (natural order Smilacaceæ) yield the sarsaparilla of the materia medica, which is in high repute as an alterative. The sarsaparilla from *Smilax officinalis*, the produce of Central America (although sometimes called Jamaica sarsaparilla), is alone official in the British pharmacopœia. Other kinds known in commerce are Lima, probably from *S. officinalis*, Vera Cruz, from *S. medica*, Lisbon or Brazilian, from *S. papyracea*, Guatemala and Honduras, from the same. Several other species of *Smilax* are in use in other parts of the world, as *S. aspera*, in the south of Europe, its roots form Italian sarsaparilla. *S. glabra*, *S. lancifolia*, *S. ovalifolia*, and *S. prolifera* are employed in India, *S. glycyphylla* in Australia, &c.

SARSIA (see the plate at PROTOZOA), a well-known genus of Medusæ or Jelly fishes, and perhaps more properly regarded as the floating reproductive buds or *gonophores* of fixed zoophytes. Of this genus familiar species are the *Sarsia gemmifera* and *S. prolifera*. Considerable interest attaches to these Cœlenterrates from the fact that in their medusiform state they have been observed to produce buds or *gemmæ* from various parts of their surface. Thus, from the sides of the polypite or alimentary canal in *Sarsia gemmifera*, and from the bases of the tentacles in *S. prolifera*, medusa like buds may be observed to be developed, and these buds finally detach themselves from the parent organism, and swim about freely in the sea, in a manner similar to their parents. The *Sarsia* itself, being produced from a zoophyte by a process of budding, is a zooid of the second generation or *deuterozooid*, whilst the little *Sarsia* produced from the latter are termed *tritozooids*. The *Sarsia* themselves sooner or later develop true reproductive bodies (ova and spermatozoa), and from these new zoophytes are produced.

SARTHE, a department of France, bounded north by the department of Orne, east by Eure et Loir and Loir et-Cher, south by Indre et Loire and Maine et-Loire, and west by Mayenne, greatest length, north to south, 61 miles, greatest breadth, 48 miles, area, 2395 square miles. It is of a very compact and somewhat circular form, and has a diversified surface, presenting tolerably fertile plains, sloping vineyards, pleasant well watered valleys, and extensive forests. Besides corn, hemp is extensively grown, and a large portion of surface is occupied by orchards, furnishing excellent cider. The wine produced is of an ordinary quality. Clover seed is exported to Holland and England, and swine and cattle are reared in great numbers for the Paris and other markets. The only mineral of any consequence is iron, but there are excellent sandstone, limestone, millstone, slate, and marble quarries. Some fine rock-crystals and

garnets are found. Sarthe includes the four arrondissements La Flèche, Le Mans, Mamers, and St. Calais. Le Mans is the capital. Pop (1896), 424,590, (1901), 422,944.

SARTI, GIUSEPPE, a composer, was born at Faenza in 1729, received the rudiments of his musical education while officiating as a choir-boy in the cathedral of his native town, and afterwards studied counterpoint under Padre Martini at Bologna. At the age of twenty two his first opera, *Pompeo in Armenia*, was written and put upon the stage at Faenza, and was well received. Other operas soon followed, and the young composer was invited in 1756 to Copenhagen, where he was appointed court chapel master—an office which he held for nine years. He then returned to Italy, and paid a season's visit to London. In 1770 he was nominated director of the Conservatory dell' Oppedalotto, and in 1779 chapel-master of the Milan cathedral. In 1784 he was invited by the Empress Catharine to St. Petersburg, and appointed her chapel master. At the command of the empress he founded a musical conservatory at Ekaterinoslav, and for his services was very liberally treated, and raised to the highest rank of nobility. The severity of the Russian climate at last told on his constitution, and he resolved to return to his native country, but died on the journey at Berlin in 1802. He wrote about thirty operas in all, which are now quite forgotten, though his *Giulio Sabino* is greatly praised by Dr. Burney. An exquisite sacred terzetto, *Amplius Lava Me*, is still performed and deservedly admired. Sarti gave musical instruction to Cherubini.

SARTO, ANDREA D'AGNOLO DEL, a painter of the Florentine school, was born at Florence, on 16th July, 1486. His family name is sometimes incorrectly given as Vannucchi. The name del Sarto (of the Tailor) was applied to him from the occupation of his father. His teachers were not of a high order, and he cultivated his talents principally by the study of great masters, such as Leonardo da Vinci and Michael Angelo. Some maintain that he was deficient in invention, whence in some of his compositions, he made use of the engravings of Albert Durer, which had then become known. He painted many pieces for his native city. Francis I. induced him by a considerable salary to go to France in 1518. He soon went back to Italy, owing to the importunities of his wife, and appropriated to the use of himself and her large sums which had been given him by his royal patron to purchase the pictures of great masters in Italy. He repented, it is true, of his fault, but could not recover the king's favour. Among other works he painted about this time the beautiful *Sacrifice of Abraham*, which has since been placed in the gallery of Dresden. He had a wonderful skill in imitation. He copied Raphael's portrait of Leo X. so exquisitely as even to deceive Giulio Romano, who had aided Raphael in the drapery. Among his most celebrated works is *A Burial*, in the Pitti palace, and *The Dead Saviour with Mary and the Saints*, in the gallery of the grand duke, also a beautiful *Madonna*, in the church of l'Annunziata, called *Madonna del Sacco*, and several others in Florence, a *Charity*, now in Basel, *Tobias with the Angel*, and several *Holy Families*, the *History of Joseph*, in two paintings, in the Paris museum. In 1529, when Florence was taken, the soldiers on entering the refectory which contained his picture of the Last Supper were struck with awe, and retired without committing any violence. He died at Florence on 22nd Jan., 1531. His colouring both in fresco and oil was full of sweetness and force, his draperies are easy and graceful. The nude, in his compositions, is excellently designed, but his figures want that force and vivacity which animate the works of other great

painters, though they possess correctness, truth, and simplicity. Sometimes he is too anxious to produce effect.

SARTORIUS MUSCLE (tailor's muscle, from the Latin *sartor*, a patcher, tailor), a muscle of the thigh which is attached at one end to the edge of the anterior, superior, spinous process of the ilium or chief bone of the pelvis, and at the other to the superior, anterior, and internal part of the tibia. It has obtained its name from the fact that it is by the contraction of the two sartorius muscles that the legs are crossed in sitting in the manner in which tailors usually do.

SARUM, Old, an ancient and now deserted borough in Wiltshire, 2 miles north of Salisbury. It was anciently a considerable city, and by the Romans called *Sorbidunum*, though at present reduced to some ruins and intrenchments. Two members, however, up to the passing of the reform bill of 1832, were returned to Parliament by the proprietors, and the election took place in the field, on the spot where the last houses of the city stood. As much as £60,000 has been paid for the small estate on which the borough stood in order to have the privilege of nominating two members. William Pitt made his first appearance in Parliament as a member for this rotten borough. It was the original situation of Salisbury (New Sarum), and the bishop had a castle here, but the see was removed to Salisbury in the year 1219. Before the Reformation the most celebrated liturgy in use in England was that styled the Sarum liturgy, compiled by a Bishop of Salisbury in the eleventh century.

SARZANA, a town of Northern Italy, in the province of Genoa, 8 miles east of Spezia, near the Magra. Its wide and deep fosses have been partly filled up, and converted into gardens, but it is still surrounded by massive walls, and has one principal street in the line of the public road, which is spacious, handsome, and well paved. The chief edifices are the cathedral (built in 1200), with a majestic front, lined with white marble, and adorned with sculptures, another elegant church, a handsome town-house, an old castle, a diocesan seminary, a missionary college, and several superior schools. Sarzana is a very ancient town, having been founded in 176 B.C. It belonged for a long time to Tuscany, but was exchanged with the Genoese for Leghorn in the fifteenth century. It is the birth place of Pope Nicholas V. Pop. 5396.

SARZEAU, a town and commune of France, in the department of Morbihan, on the south side of the Bay of Morbihan, 14 miles from Vannes. It has a lofty church, with a tower, but is chiefly deserving of notice for a tumulus in its vicinity, the largest in France and as the birth-place of Le Sage. Pop. (1896), 5097.

SASIN (*Antelope bezoartica*), a species of Antelope, which is sometimes known as the Indian Antelope. It occurs in India, and averages in height about 2½ feet at the shoulder. The general body-colour is a grayish or blackish-brown on the upper, and white on the under parts. The breast and lips are white, and there is also a white circle round the eyes. The outer aspects of the limbs, the front of the feet, and the tip of the tail are very dark or nearly black in colour. The adult males, especially in old age, are said to have the black and white hues of the body exhibited in very marked contrast. The horns are of large relative size, and are of spiral form, diverging at the tips. They are annulated or marked by strong rings from the base almost to their tips. These animals are gregarious in habits, each herd numbering from fifty to sixty individuals, and one buck only being generally included in this number.

The Sasins are extremely agile, and when alarmed or pursued run with long jumping leaps, each leap covering from 25 to 30 feet of ground. They are hunted by means of dogs, by the cheetah or hunting leopard, and by the aid of falcons. The young are born in a helpless condition, and appear to be closely tended by the mother for some time after birth. If a doe, the young animal joins the maternal herd, but if a male it is generally driven away by the old buck to seek mates for itself.

SASKATCHEWAN. See SUP.

SASSABY, or **BASTARD HARTBEEST** (*Dama lunatus*), a genus of Antelopes (which see) found in Central Africa, living gregariously in herds of small size, numbering from six to ten individuals. The body-colour is a reddish brown, the outer aspects of the limbs being of dark hue, whilst a blackish stripe marks the forehead and middle of the face. A grayish blue tint may sometimes be noticed to prevail over the entire body. These animals generally frequent the neighbourhood of streams and springs.

SASSAFRAS. See LAUREI.

SASSANIDÆ, a Persian dynasty of kings, which succeeded the Parthian dynasty of the Arsacids, and reigned from 226 B.C. to about A.D. 636. The dynasty began with Ardishir Bahagán, and owes its name to the grandfather of that prince, named Sassan. The last king of the dynasty died in 651, about fifteen years after his territory had fallen into the hands of the Mohamedans. See PERSIA.

SASSARI, a town of Italy, in the island of Sardinia, capital of the province of same name, on a gentle slope above the Turritano, 105 miles N.W. of Cagliari. It is surrounded by dilapidated walls, flanked with towers, and entered by five gates, is well built, having many handsome shops and houses, particularly in its main street, and has numerous churches, one of them a large cathedral, with an elaborate façade, several monasteries and nunneries, three handsome palaces of the governor, Archbishop, and Duke of Asinara, a university, diocesan seminary, an old citadel, converted into barracks, a library, hospital, &c. The only manufacture of importance is tobacco, which is grown largely in the district, and worked up in a very extensive factory, the trade is chiefly in grain, oil, cheese, and goat skins. Pop. of town in 1901, 33,178, of province occupying the north part of the island, 307,314.

SASSOFERATO, a painter, so called from the place of his birth, a town in the province of Ancona, in Italy. His true name was *Giambattista Salvi*. He was born in 1605, learned the elements of his art from his father, and afterwards studied under Domenichino, Guido, and Albani. His works resemble those of the latter, and are executed with the same care. His paintings were chiefly the Madonna and Child, the latter sleeping. His heads are expressive and lovely. He died in 1685.

SATALIEH, or **ADALIA**, a seaport in Turkey in Asia, on the south coast of Anatolia (Asia Minor), at the head of the gulf of the same name. It is begirt with a double wall. The neighbourhood is fertile, and abounds with orange, lemon, fig, and mulberry trees. A considerable trade by sea is carried on. Pop. 13,000.

SATAN. See DEVIL.

SATARA, an executive district in Hindustan, in the Presidency of Bombay, bounded on the north by Puna, on the north and north east by Sholapur, on the south by Belgaum, the Southern Mahratta Jaghires, and Kolapur, and on the west by the Western Ghauts, area, 4988 square miles, population, 1,062,350. The surface forms part of the tableland of the Deccan, and is much broken by ridges, ravines, and isolated heights, many of the last crowned

by fortresses. The chief rivers are the Kistna, which flows south east through its centre, the Nira and Bhima forming its north, and the Gutpurba forming its south frontier. Satara, which in the seventeenth century was at the head of the Mahratta Confederacy, was long one of the best managed of the native rajaships. It did not cease to exist as a separate state till 1848.

SATARA, or **SATTARA**, a town, Hindustan, in the Presidency of Bombay, capital of the district of same name, clustered round the base of a precipice, which rises abruptly from the plain to the height of 800 feet, and is crowned by a decayed fort, 55 miles south of Puna. It consists partly of a long street of very indifferent houses, covered with tiles, and has no edifice of any consequence except the rajah's palace, which is a modern structure. About 2 miles east, in a valley, which is one of the most pleasant in the Deccan, are the European cantonments. The town was formerly the chief seat of the Mahrattas. Pop (1891), 29,601.

SATELLITES, secondary planets or moons. One satellite has been observed with Neptune, four with Uranus, Saturn has eight, Jupiter five, Mars two, and the earth one. The rings of Saturn are composed of a great multitude of small satellites.

SATIN, a soft, closely woven silk, with a glossy surface. In the manufacture of other silken stuffs each half of the warp is raised alternately, but in weaving satin the workman only raises the fifth, eighth, or tenth part of the warp, thus the weft is hidden beneath the warp, which, presenting an even, close, and smooth surface, is the more capable of reflecting the rays of light. In this way satin acquires that lustre and brilliancy which distinguish it from most other kinds of silks. The chief seats of this branch of manufacture are Lyons in France, and Genoa and Florence in Italy. From the East Indies are imported those light stuffs called Indian or Chinese satins. They are either plain, damasked, striped, open worked, or embroidered. Both in lustre and execution they are far inferior to the Lyonesse satins, they, however, possess this peculiar property, that, even after scouring, they retain their original gloss.

SATINET, an inferior fabric, woven much thinner than ordinary satin. The name is also given to a kind of cloth woven, with cotton warp and woollen weft, to imitate satin.

SATIN-SPAR, a variety of calc-spar or carbonate of lime, distinguished by a silky lustre and fibrous structure. The name is also sometimes applied to fibrous gypsum or sulphate of lime.

SATIN-WOOD, an ornamental wood of great beauty, the product of the *Chloroxylon swietenia* of India and Ceylon. The wood is very hard, close-grained, and durable, and of a light orange colour, it takes a fine polish, and is suitable for all kinds of ornamental work, but is rather apt to split. For picture frames it is nearly equal to American maple. In some instances the timber is beautifully feathered, and the flowered or feathered satin-wood, when first polished, is one of the most beautiful woods. The tree which produces it is small, and when straight would afford a log of from 3 to 6 inches square. Several other species of trees, in the East and West Indies, produce woods of similar appearance and quality, and known by the same name.

SATIRE, in the widest sense of the word, pungent ridicule or cutting censure of faults, vices, or weaknesses. In a narrower sense, in which it is more commonly used, it is a poem, of which ridicule and censure are the object and chief characteristic. This species of poetry had its origin with the Romans. The name is derived from *satura* (*lanx*, a dish, under-

stood), which meant a dish of various kinds of food, a medley, and refers, originally, to the mixture of subjects treated, and of metres used, in the earlier productions of this kind. Satire is one of the latest branches of poetry cultivated, because it presupposes not merely much natural wit, but also acute observation, and much variety of life and manners to call this wit into exercise. In fact it is only in an advanced state of society, where folly and vice force themselves on the public eye, that a taste can exist for this species of production. As the object of satire is always castigation, it is distinguished from mere wit, which may occupy itself simply with the ludicrousness of particular relations. The form of satire is very varied. It may be in the shape of epistles, tales, dialogues, dramas (as with Aristophanes), songs, epics, fables, &c. The most common form of satire, however, is that of a simply didactic composition. The proper didactic satire originated, as we have said, with the Romans, and its inventor was Lucilius (148-103 B.C.). Horace, Juvenal, and Persius developed it. Vulpius, Casaubon, and Konig have written on the Roman satire. Of the modern satirists we may mention, among the Italians, Ariosto, Alamanni, Salvator Rosa, Menzini, Dotti, Gasparo Gozzi, Alfieri, &c., among the Spaniards, Cervantes, Quevedo, and Saavedra, among the French, Vauquelin, Regnier, Boileau, Voltaire, Béranger, &c., among the Germans, Seb. Brand, Ulr. Hutten, Fischart, Haller, Rabener, Lichtenberg, Falk, Wieland, Goethe, &c., among the English, Donne, Rochester, Dryden, Butler, Pope, Swift, Young, Churchill, Johnson, Gay, Burns, Cowper, Peter Pindar (Wolcott), Gifford, Byron, James and Horace Smith, Hood, J. R. Lowell (American), Thackeray, &c. The Greeks had not the proper satire. The poems of Archilochus, and that of Simonides, were more properly lampoons, and the *skolia* had probably a didactic form, but were of the nature of parody. Entirely different from the satire was the *drama satyricum* of the Greeks, invented by Pratinas—a mixture of tragic, at least heroic action with comic. These dramas served as interludes and after-pieces, and had a low comic character. We possess only one—the Cyclops of Euripides. See Cruttwell's or Teuffel's History of Roman Literature, and James Hannay's Satire and Satirists.

SATLEJ. See **SUTLEJ**.

SATRAPS, in the ancient Persian Empire, the governors of the provinces which were called *satrapies*. The power of the satrap, so long as he retained the favour of his sovereign, was absolute, he levied taxes at his pleasure and aped the capricious tyranny of his master unchecked. When the monarchy of Cyrus began to decline many of the satraps threw off their allegiance, and founded independent kingdoms of their own. The term satrap is sometimes used to signify a petty despot.

SATURATION, in meteorology. A space is said to be saturated with aqueous vapour when, if for the least lowering of temperature, condensation will take place. When the vapour in a saturated space, removed from a source of additional vapour, is raised in temperature, it is no longer saturated, for it will not deposit moisture till the temperature is lowered to below the *dew-point*, which is its first temperature. The air is said to be saturated with moisture when it should be said that a space is saturated, for a definite amount of aqueous vapour will saturate a given space when that vapour is at a definite temperature whether air occupies the space jointly with the vapour or not.

Suppose a vessel is filled with air at a temperature of 100° C., and at ordinary atmospheric pressure, if some water is introduced, and the whole thing kept at 100° C., the pressure will become two atmospheres,

showing that just as much steam or vapour has been required to saturate the space as if the air had been absent. If we could diminish the vessel to half its size we should have a pressure of three atmospheres, for the pressure of the air is doubled by making its volume one-half, and the tension of the steam remains constant. On the other hand, if our space expanded to twice its size, the pressure would be one and a half atmosphere, for in this case the tension of the air becomes one-half, while if water enough has been introduced to saturate the larger space, that of the vapour is constant. Changes of temperature will produce changes in the tensions of the air and of the vapour (the vapour is supposed to be always in contact with the water producing it), but the changes in the tension of the vapour will be exactly those which would take place if there had been no air in the vessel. We may conceive the earth as possessing an atmosphere of vapour which varies as to temperature and pressure in different regions, just as the air atmosphere varies, but which has the power of becoming visible as cloud where the temperature falls below that corresponding to saturation. Cloud is an assemblage of very small particles of water, and if these, in slowly falling, do not encounter a region where they are reconverted into vapour, they will reach the earth as rain. The air affects the vapour atmosphere by carrying heat from one place to another, and by disturbances of various kinds.

The tensions of saturating masses of vapour rise more rapidly than the corresponding temperatures, and this has very important influences. To take an example, suppose a saturating mass at a temperature of 10° Fahr mixes with an equal saturating mass having a temperature of 60° Fahr, the combined temperature will be 35° Fahr, the elastic force or tension of aqueous vapour at 10° Fahr is 0.68 inch of mercury, and the tensions at 60° Fahr and 35° Fahr are 518 and 204 inch respectively, the tension

204 inch is less than $\frac{0.68 + 518}{2}$ inch (293), so that

we have a quantity of vapour which would fill the space occupied by the combined masses with a tension of 0.89 inch of mercury available for forming a cloud. We have chosen a simple case for the sake of illustration, but it is evident that two masses of vapour, each above the temperature of saturation, may, in mixing, become supersaturated. In many cases clouds, rain, and dew are formed from the temperature being lowered by currents of air, or by contact with the cool surface of the ground.

The degree of saturation at any place is called the *hygrometric state*, and it is measured by the fraction whose numerator is the actual tension of the aqueous vapour, and whose denominator is the tension of saturation for the temperature of the place. The appended table (taken from Mr Glaisher's hygrometric tables) of tensions gives denominators for such fractions at intervals of 5°, the numerators are found by means of a hygrometer

Temp Fahr	Tension of Vapour at Saturation in Inches of Mercury	Temp Fahr	Tension of Vapour at Saturation in Inches of Mercury
0°	0.044	45°	0.299
5°	0.054	50°	0.361
10°	0.068	55°	0.438
15°	0.086	60°	0.518
20°	0.108	65°	0.617
25°	0.135	70°	0.738
30°	0.167	75°	0.868
35°	0.204	80°	1.023
40°	0.247		

SATURATION OF A MAGNET See MAGNETISM.

SATURDAY (*Saturni dies*, Saturn's day), so called from the planet Saturn, the seventh day of the week, the *Sabbath* of the Jews. It is called by the Italians *Sabbato*, by the French, *Samedi*, and by the Germans, *Sonnabend* (Sunday eve), or in High German, *Samstag*, a corruption of *Sabbathstag* (Sabbath day), and in Lower Germany, *Saterdag*, of the same origin as the English.

SATURN, originally an old Italian divinity who was afterwards confounded with the Kronos of the Greeks. Uranus (Heaven) and Gæa (Earth) were the parents of the six Titans. The youngest of these Titans was Kronos, who, when Uranus imprisoned his children, and thereby brought upon himself the anger of their mother, was instigated by her to vengeance, armed himself with a sharp knife or sickle, and as Hesiod says, cut off the privities of his father, whereupon Uranus was deprived of his sovereignty. The Titans set free their imprisoned brothers, and the government fell into the hands of Kronos. He then married Rhea, who bore him several sons and daughters. But as he well knew that he should be dethroned by one of his sons he devoured the children that were born to him. Zeus alone, whom Rhea concealed in Crete, where Gæa promised to educate him, was preserved. Rhea presented Kronos with a stone, in swaddling-clothes, which he swallowed instead of the new born infant. By means of an emetic administered to him by Gæa and Mêtis, he threw up the stone, as well as all the children whom he had swallowed, by the assistance of whom Zeus made war upon him and the Titans, and dethroned him after a contest of ten years. Kronos was, together with the Titans, confined in the dungeons of Tartarus, whence, however, according to the later poets, they were released, according to Pindar, Zeus recognized Kronos as the lord of the Fortunate Island in the western ocean. The unknown Hesperia was considered as the land where Uranus and the succeeding Titans reigned. But when this land became more accurately known Kronos was transferred to Italy. Kronos now becoming blended with Saturn, Saturn was represented as dethroned, cast out from his kingdom, and flying before his son, and as having selected a place of refuge in Italy, and concealed himself in Latium (from *latere*). There the aged King Janus shared with him his throne, and Saturn built upon the Saturnian Mount (afterwards the Capitoline Hill) the city of Saturnia. He ruled the aborigines of the Peninsula with paternal mildness and beneficence, taught them agriculture, suppressed their savage mode of life, and introduced among them civilization and morality. The result was that the whole country was called Saturnia, or the land of plenty. Saturn was suddenly removed from the earth to the abode of the gods, and Janus erected a temple to him. His temple stood in the Roman forum, and in it were preserved the public treasures of the city. The Saturnian period was the golden age, which poets vied with each other in celebrating. At that time the years rolled tranquilly away, and every moment offered an abundance of untroubled enjoyment. See SATURNALIA.

SATURN, in astronomy, the sixth planet in order of distance from the sun. Saturn's perihelion distance is 823,301,000 miles, and his aphelion distance is 920,973,000 miles. The eccentricity of his orbit is therefore 0.055996. The plane of his orbit is inclined at 2° 29' 28" to the plane of the ecliptic. His equatorial diameter is about 70,150 miles, and his polar diameter about 62,761. The mass of Saturn is 89.7 times the mass of the earth. The revolution of Saturn on his axis takes about ten and a half hours. The plane of his equator is inclined nearly 27° to the plane of his orbit. The satellites of Saturn

are eight in number, and differ very much from one another in size. The rings of Saturn have been a subject of curiosity and speculation ever since the time when Galileo first observed them through his defective telescope, and various theories have been put forward to account for them. It is almost certain that Saturn's rings are a multitude of small bodies or satellites.

Sir W. Herschel has observed a change of form occurring to Saturn, the planet presents at times what has been called a 'square-shouldered' aspect.

SATURNALIA, a festival among the Romans, instituted, according to the popular belief of the ancients, in commemoration of the happy period under the reign of Saturn, when freedom and equality prevailed, when truth, confidence, and love united all, and violence and oppression were unknown. It can scarcely, however, be doubted that the unrestrained jollities of the Saturnalia were indulged in by the rustic population of Latium as a sort of joyous harvest home long before Saturn, who blessed the labours of seed time with abundant fruit, had been transformed by the later Græcizing myth-mongers into a divine king. It continued at first one day, then three, afterwards five, and finally, under the Cæsars, seven days, namely, from the 17th to the 23d of December. The festival began as soon as the woollen bands which had bound the feet of Saturn's statue through the year were removed. At the commencement of this festival a great number of wax tapers were lighted in the temple of Saturn, as a sign that no more human victims were to be sacrificed. During its continuance no public business could be transacted, the law courts were closed, the schools kept holiday, to commence war was impious, and to punish a malefactor involved pollution. The slaves were freed from restraint, wore caps as badges of freedom, and went about dressed in tunics, adorned with purple, and in white togas. Masters and slaves changed places, and while the servants sat and banqueted at the tables, they were waited on by their masters and their guests, who, if they did not do this, were obliged to submit to all sorts of ridiculous punishments. Jests and freedom everywhere prevailed, and all ceased from their various occupations. In the last days of the festival, which were added in later times, presents were sent by one friend to another, particularly little images of the gods, *agulla* (seals), &c., whence these days were sometimes called *Sigularia*, and persons were greeted with the acclamations of 'Io Saturnalia! bona Saturnalia!' Some prisoners were also set free, who dedicated their chains to Saturn.

SATYRS, in Greek mythology, were a race of woodland divinities, who were in later times inseparably connected with the worship of Dionysus (Bacchus), and represent the luxuriant vital powers of nature. We do not find them mentioned by Homer, but meet with them first in the works of Hesiod, who describes them as a worthless race, unfit for work. They were popularly supposed to be the sons of Hermes (Mercury) and Iphthima, or of the Naiads. They appear in works of art as robust beings, with bristly hair, broad snub noses, ears large and pointed like those of animals, two little horny knobs on their foreheads, and a tail like that of a horse or goat. They are represented at different stages of life, the older ones were usually termed *Sileni*, and the younger ones *Satyrisci*. They are described as being fond of wine (whence they frequently appear with a wine cup or a thyrsus in their hands), and of every kind of sensual gratification, whence they are often represented sleeping, playing musical instruments, or engaged in voluptuous dances with nymphs. Like all the forest and field deities,

they were greatly dreaded by mortals. By later writers, especially the Roman poets, the satyrs are confounded with the Italian Fauns, and are accordingly represented with larger horns and goats' feet, although they were originally quite a distinct class of beings. Ancient sculptors were fond of the satyr as a subject—one of the most famous specimens of Greek art being the Satyr of Praxiteles.

SAUCE, a liquid or semi-liquid condiment used for adding relish to food, and distinguished from gravies by their foundation being composed of gelatine, milk, cream, butter, or some other mild material variously flavoured. Sauces were much in favour among the ancients, who used them chiefly with fish, the most notable was the *garon* of the Greeks, or *garum* of the Romans, prepared from the anchovy or from the intestines of the mackerel (*scomber*). On modern tables sauces of almost infinite variety are to be found, the basis being apples, lemons, tomatoes, mushrooms, onions, gooseberries, mint, currants, horse radish, anchovies, oysters, eggs, &c., more or less mixed with butter, gravy, flour, and cream, and flavoured with nutmegs, pepper, salt, shallot, &c., to suit individual tastes. Many sauces are to be had from the shops ready for use, as the Worcester, Harvey's, and others. See **KETCHUP**.

SAUCISSE, in the military art, is a long train of powder sewed up in a roll of pitched cloth or leather, serving to set fire to mines. To every mine there are generally two, that if one fail the other may take effect. The length is determined by circumstances.

SAUCISSON, in fortification, a kind of fagot, made of thick branches of trees, bound together, to cover the men while exposed to the enemy's fire, when on some hazardous employment. It is also used to repair breaches, stop passages, and make traverses over wet ditches.

SAUERKRAUT (German), a salted preparation of cabbage, much esteemed in Germany and other northern European nations, and of which large quantities are prepared for winter use. The common white cabbages are taken when they have formed firm hearts, these are sliced into small pieces and packed in layers in a cask with culinary salt, a few juniper berries and caraway seeds or cloves being added according to taste, the whole mass being packed down as hard as possible without crushing the slices, and covered with a lid pressed down with weights. Partial fermentation sets in after some time, and the watery juice rises to the surface. This juice is poured off, and water containing a solution of salt is poured in, and changed till it rises without a scum and a fetid smell. The cabbage is then fit for use, and is stored in a cool place in the barrels still under pressure. It may be eaten boiled in the same way as fresh cabbages, or stewed with bacon or salted meat.

SAUGOR, or **SÁGOR**, a town in Hindustan, in the Central Provinces, principal place of the executive district of same name, occupies an elevated position on the banks of a lake surrounded by hills, near the river Bes or Bessi, 185 miles north from Nágpur. To the north-east of the lake are the British military cantonments, extending from north to south in a continuous line of about 1½ mile. Saugor contains a collegiate school, in which instruction is given both in the English and native languages. The scenery of the lake is beautiful, and large quantities of fish and wild fowl frequent its waters and banks. The total population of the town and cantonments in 1891 was 44,674. Saugor was first ceded along with its territory to the British in 1818. The district has an area of 4005 square miles, and a population in 1891 of 591,743.

SAUL, king of Israel from about 1095 to 1056 B.C. He was the son of Kish, a wealthy and powerful Benjamite, and was noted for his personal beauty and courage, and when the people became dissatisfied with the theocratico-republican constitution, was selected by Samuel for their king. He was not acknowledged by the whole people until after he had gained a victory over the Ammonites. Repeated successes over the Philistines, Edomites, Moabites, Ammonites, and even over a king beyond the Euphrates, confirmed his authority. But Samuel, who had reluctantly parted with the supreme power, continued to keep up a party in the nation, and, being offended by the encroachments of the king on the privileges of the priesthood, and by his disobedience to the commands of Jehovah in a war against the Amalekites, secretly anointed David as king. Saul discovered his rival, and his hatred against him was increased by the reputation which the latter acquired by his warlike exploits. A civil war, which broke out between the partisans of David and those of Saul, was terminated by the death of the latter, who, after the defeat of his forces by the Philistines, fell upon his own sword. The history of Saul's frenzy has furnished Alfieri with the subject of one of his master-pieces—*Saul*, a Lyric Tragedy.

SAUMAISE. See **SALMASIUS**.

SAUMAREZ or **SAUSMAREZ**, **JAMES**, **BARON DE**, a distinguished British naval officer, the son of an old French family, whose ancestor, it is said, followed William the Conqueror to England, was born in St. Peter Port, Guernsey, 11th March, 1757. He entered the navy at the age of thirteen, accompanied Sir Peter Parker, and on account of his gallantry at the attack on Charleston was made lieutenant. He served in America during the four following years, was raised to the rank of commander for his conduct in the engagement between the English and Dutch fleets off the Dogger Bank, 5th August, 1781, and as captain of the *Russell*, a ship of the line, gained great honour in the great combat between Rodney and De Grasse. In 1793 he was knighted for the capture of the *Réunion*, a French frigate, a vessel superior in size and equipment to his own, and without losing a single man. In the following November, while in the command of a small squadron, he was attacked by a French force double his own, but maintained a running fight, and succeeded in saving all his vessels. In March, 1795, he was appointed to the command of the *Orion*, seventy four, in which ship he opened the battle of L'Orient, in which the French fleet was defeated, 23d June, he afterwards sailed with Sir John Jervis to the Mediterranean, and shared in the victory off Cape St. Vincent, 14th February, 1797. He was second in command to Lord Nelson in the glorious victory of the Nile, 1st August, 1798, and on his return to England received the decoration of the order of the Bath, and was appointed colonel of marines. In 1801 he was made a rear-admiral of the blue, created a baron, and appointed to the command of the squadron cruising off Cadiz. In this year he fought his greatest engagement, defeating a Franco-Spanish fleet of ten sail of the line and four frigates, his own squadron consisting of only half that number, two of the enemies' ships were blown up, a seventy four captured, the remainder making their escape owing to the darkness of the night, 12th July. For this brave action Sir James received the thanks of both houses of Parliament, a pension of £1200 per annum, and the freedom of the city of London. At the beginning of the war with Russia (1809) he commanded the Baltic fleet, and by his diplomatic as well as his naval skill was largely instrumental in detaching that power from its alliance with France. In 1814 he became admiral, in 1821 vice-admiral of

Great Britain, was raised to the peerage of the United Kingdom with the title of Baron de Saumarez, of Saumarez, in 1831, and thenceforth lived in retirement until his death, which occurred at Guernsey, 9th October, 1836. See *Memoires of Admiral Lord de Saumarez*, by Sir John Ross (two vols 8vo, London, 1838).

SAUMUR, a town of France, in the department of Maine et Loire, picturesquely situated on the Loire, here crossed by a magnificent bridge, 25 miles S.S.W. of Angers. It consists of a high and low town on the left, and a suburb on the right bank, is irregularly built, particularly in the high town, which occupies a steep acclivity, but has many handsome houses lining its fine quay, an old castle, crowning a commanding height, three very ancient churches, one of them with a massive tower and another with a magnificent dome, a courthouse, town-house, communal college, military and other schools, public baths, a library, theatre, &c. The manufactures are linen, leather, refined saltpetre, and works in enamel and glass, and the trade is chiefly in corn and flour, wine, hemp, flax, and iron. Saumur early embraced the Reformation, and had attained great prosperity, which was destroyed by the revocation of the Edict of Nantes. The Vendéans gained a signal victory here in 1793. It contains one of the most important cavalry schools of France. Pop. (1896), 14,732.

SAUNDERSON, **NICHOLAS**, a celebrated blind mathematician, born at Thurlston, in Yorkshire, in 1682. When a year old he entirely lost his eyesight through the small pox. Notwithstanding this privation he acquired a knowledge of Latin and Greek, and having pursued his studies for some time, with the assistance of friends, he was in 1707 sent to Cambridge. He took up his residence at Christ's College, and soon commenced giving lectures on optics. He became acquainted with Sir Isaac Newton, and was chosen mathematical professor. He died in 1739. His treatise on algebra was published after his death, at Cambridge (1740, two vols.). He left other works in an imperfect state, among which were comments on Newton's *Principia*, which were published at the end of his posthumous treatise on Fluxions (1756, 8vo).

SAURIA, a term sometimes applied in the classification of the Reptiles to the order Lacertilia or Lizards, the Crocodiles being in a similar manner termed Loricata. The name Sauria is not much used in modern classification, although the term Saurian Reptiles is occasionally used as applicable to the Lizards and Crocodiles collectively, and as distinguished from the Ophidians (Snakes) and Chelonians (Tortoises and Turtles).

SAURIN, **JACQUES**, a French Protestant preacher, was the son of a lawyer at Nîmes, and born in 1677. Upon the revocation of the Edict of Nantes in 1685 his father retired with his family to Geneva, where the subject of this article made a considerable progress in learning, but quitted his studies and went into the army. When the Duke of Savoy, under whom he served, made peace in 1696, he returned to Geneva with a view to engage in the ministry. In 1700 he visited England, where he preached nearly five years to his fellow refugees in London. He subsequently became pastor to a congregation of French refugees, who assembled in a chapel belonging to the Prince of Orange at the Hague. Here his pulpit oratory was so greatly admired that it roused the bitter envy of his clerical brethren, who charged him with heresy, and subjected him to a series of petty persecutions which shortened his life. He died in 1730, at the age of fifty three. This eminent preacher possessed great talents and a fine address; his voice was strong, clear, and harmonious, and his

style pious, unaffected, and eloquent. He had the happy art of adapting his arguments, with great skill, to the understanding of the audiences before whom he spoke, and was persuasive and pathetic, or plain, clear, or argumentative, as best suited his subjects or his hearers. His principles were those of moderate Calvinism. He was the author of twelve volumes of Sermons (8vo), selections from which were translated into English, and published between 1775 and 1784, in five volumes, by Robert Robinson (with a Memoir), a sixth being added in 1796 by Dr Henry Hunter. Among his other works are *État du Christianisme en France* (La Haye, 1725), *Abrégé de la Théologie et de la Morale Chrétiennes* (Amsterdam, 1722), *Discours sur les Evénements les plus mémorables du Vieux et du Nouveau Testament* (Amsterdam, 1720-28). Of this, his most considerable work, he nearly completed three volumes folio, to which Roques added a fourth on the Old Testament, and Beausobre two more on the New Testament.

SAUROPSIDA, a primary division of the Vertebrate sub kingdom of animals, the other two divisions being the *Ichthyopoda* (Fishes and Amphibia) and the *Mammalia*. The Sauropsida include the Reptiles and Birds, and although no two groups of animals apparently present a greater diversity of external form than these two classes, there yet exist between them close bonds of affinity, from a structural as well as developmental point of view. The province Sauropsida—or Reptiles and Birds collectively—is characterized firstly by the fact that the exoskeleton, or hard parts developed by the epidermis or outer skin, consists of scales or feathers. These scales exist in Reptilia, whilst feathers form the characteristic covering of Birds. The centres of the vertebræ are always ossified. The skull has an ossified occipital bone or segment, which bears a single convex 'condyle,' or process whereby the skull articulates with the spine or vertebral column. Into the formation of this condyle the ossified exoccipitals and the basi-occipital elements of the occipital bone respectively enter. The mandible or lower jaw is always developed, and each half or ramus of this element of the skull consists of a piece (*articular ossification*) by which it articulates with the skull, as well as of several other distinct pieces or mebrane bones. The lower jaw in Sauropsida is thus of compound nature, and contrasts, in this respect, with the lower jaw of Mammals, which is composed of two simple and single halves which unite to form the single bone. The lower jaw or mandible of Sauropsida, further, does not articulate directly or of itself with the skull, but is joined to it through the intervention of a special bone known as the *os quadratum* or *quadrate bone* (which see). The ankle-joint in Sauropsidans is situated not (as in Mammalia) between the tibia or shin bone and the astragalus or chief bone of the ankle, but between the divided (*proximal* and *distal*) portions of the tarsus or ankle-bone. Thus in Birds, for example, the ankle joint exists in the middle of the tarsus or ankle, the upper or proximal half of the tarsus being ossified to the lower end of the tibia or shin-bone, whilst its distal or lower half is united to the metatarsal bone, to form the characteristic bone in Birds known as the *tarsometatarsus*. The ankle-joint, therefore, opens or exists between these divided portions of the tarsus. In Reptilia (which see) the same disposition of parts exists, with this exception—namely, that the tarsal and metatarsal bones are not united as in Birds.

With regard to the viscera and internal organization of Sauropsidans, the alimentary canal may be noted to invariably terminate in a *cloaca*, or chamber common to the efferent ducts of the generative

and urinary systems, as well as to the intestine. The heart is three chambered or *trilocular* (as in most Reptiles), or four chambered or *quadrilocular*, as in Crocodilia and in all birds. The red blood-corpuscles are oval in shape, and are always nucleated. The aortic arches, or great blood vessels springing from the heart, are generally two, or may be more in number, although they may be reduced to one, which then turns towards the right side. The latter condition, that of a single aorta, is seen in the Birds, which possess one aortic arch on the right side.

All Sauropsidans agree in breathing by lungs throughout their entire existence. Gills or branchiæ are therefore never developed in connection with this province of Vertebrata, which is included in the *Abi anchrate* ('gill less') section of the sub-kingdom. The bronchi or air tubes of the lungs do not branch dichotomously. The chest or thorax is never completely separated from the abdomen by a *diaphragm* or *midriff*, as in Mammalia, although (as in some Birds) the diaphragm may be represented in a tolerably perfect condition. The interior of the body in Sauropsida may therefore be held to exhibit but a single undivided cavity. The reproductive organs open, as already remarked, into the cloaca. The *oviduct*, *Fallopian tube*, or efferent tube of the ovary, presents, in the lower part of its course a dilatation termed the uterus. The Sauropsida are either *oviparous*—that is, producing eggs from which (as in Birds and most Reptiles) the young are afterwards hatched, but some are *ovoviviparous*, the eggs in the latter case being retained within the parent-body (as in some Lizards and Snakes) until the young are hatched. In the course of their development an amnion and large allantois duly appear, the latter structure, which subserves the respiration or breathing of the embryo, being developed from the *vitellus* or yolk mass of the egg, which in Sauropsida is always of large size. No mammary glands exist in Sauropsida, this negative character distinguishing them from the higher division of the Mammalia.

Such are the chief characters of the province Sauropsida. It may lastly be noted that Birds differ from their neighbour Sauropsidans the Reptiles, firstly, in their exoskeleton consisting of feathers, in their warm blood, and invariably four chambered heart, in the bronchi or air tubes of their lungs opening on the surface of these latter organs, and communicating with air sacs placed in the interior of the body, in the fore limbs being adapted as true wings for the purposes of flight, and in the tarsal and metatarsal bones of the hind limbs being united to form a single bone—the *tarsometatarsal* bone. See also ORNITHOLOGY and REPTILIA.

SAURURÆ, the name given by Huxley to an eighth order of the class of Birds (see ORNITHOLOGY), specially constructed for the reception of a single remarkable fossil bird, the remains of which were found in the lithographic slates of Solenhofen, in Bavaria, a deposit belonging to the Upper Oolitic rocks. This curious bird fossil is known as the *Archæopteryx macrura*, and it differs from all living as well as all extinct birds in certain very important characters, the sum of these differences being expressed by its being included in a separate and distinct order of the Bird class. The remains of the *Archæopteryx* have been found in a fragmentary and incomplete state, leaving many points of its organization in an undetermined state, but the chief points of interest which have been definitely made out have reference to the tail, to the claws on the wing, and to the metacarpal bones. The tail was thus longer than the body, and reptile like in its conformation. It was composed of distinct and separate vertebrae, and differed from that of all other known birds in not

being terminated by a pygostyle or 'ploughshare bone.' (See ORNITHOLOGY.) Each segment or vertebra of the tail carried a pair of quill feathers. The wing of this curious bird was provided with two free claws, structures which exist in no other known bird-form. And the metacarpal bones, instead of being ossified together, as in all other birds, were free and distinct in the *Archæopteryx*. This bird averaged a rook or crow in size, and, according to Milne Edwards, it most probably perched on trees, and was a vegetable feeder.

SAUSAGE, an article of food consisting of minced meat, highly seasoned, and inclosed generally in the intestines of some animal. Among the Romans the sausages of Lucania were held in high repute, they were made of fresh pork and bacon finely minced with nuts of the stone-pine, and flavoured with pepper, cummin seed, bay leaves, pot herbs, and garum (See SAUCE.) The Bologna sausages of Italy are still highly prized, they consist of veal, salt beef, salt pork, and bacon, finely chopped up, seasoned with sage, mixed herbs, ground pepper, and mixed spice. The smoked sausages of Germany are also considered as a delicacy by many, they are made of fat and lean pork preserved for about a week by salt, saltpetre, black pepper, and all spice being rubbed into the meat, it is then cut small and mixed with some shreds of shallot or garlic, pressed into an ox skin, wrapped in a fold or two of muslin, and then smoked in the same way as ham. The skin should be tied in different places, so as to make each link about 8 or 9 inches long. Sausages, however, which have been preserved any length of time can hardly be recommended as wholesome food. Fatal cases of sausage poisoning are by no means unfrequent. The symptoms are slow in appearing, three or four days may pass before they can be observed. The poison is of a narcotico irritant character, and very dangerous. Some authorities believe that the poison is an acid formed in consequence of a modified process of putrefaction, others suppose it to be an empyreumatic oil. The pork sausages of our own country are made and seasoned in various ways to please different palates. The following is a good recipe—Chop pork, rather more lean than fat, flavour with pepper, salt, and cayenne, adding a little lemon peel if preferred, 6 oz. of bread to be chopped with every 2 lbs. of meat, press into hogs' entrails that have been soaked and perfectly cleaned. The skin should be tied at short intervals with a string. Savaloys only differ from pork sausages in being made of young salted pork, of which the fat and lean are mixed together and chopped up with a fourth part of bread, a little pepper and allspice, and a rather liberal use of sage leaves.

SAUSSURE, HORACE BENEDICT DE, a celebrated naturalist, was born at Conches, near Geneva, in 1740, and distinguished himself so much at the age of twenty-two by his proficiency in the mathematical and physical sciences, as to be appointed professor of philosophy in the University of Geneva. He continued to discharge the duties of this office for twenty-five years with reputation. The leisure which his duties left him was occupied in scientific journeys to the volcanic region of France, to the south of Italy, and to England. A favourite object of his investigations was the structure and height of mountains, and to him we are indebted for the invention of several philosophical instruments, as, for instance, an electrometer, a hygrometer, heliothermometer, &c. In 1779 he had ascended the Alps fourteen times in eight different places, and in 1787 he ascended Mont Blanc, and determined its height by barometrical measurements. On one occasion he remained for seventeen days on the summit of the Col du Géant,

and in 1789 he made the ascent of Monte Rosa. Saussure died in 1799. Among his writings his *Essai sur l'Hygrometrie* and his *Voyages dans les Alpes* (four vols. 1779-96) are the most valuable.

SAVAGE, RICHARD, an English poet of the 18th century, celebrated for his genius, irregularities, and misfortunes, was born in London about 1698. The singular story of Savage, adorned as it is by the pen of his intimate friend Dr Johnson (*Lives of the Poets*), has acquired great celebrity, but there is reason to believe that a great part of it is utterly fictitious. Savage was probably the son of a woman who had been employed to nurse a natural son of the Countess of Macclesfield by Earl Rivers. That lady always asserted—and there is no good cause for doubting it—that her child died while quite young, and that Savage was an impostor. Johnson's account, taken from Savage himself, is, that no sooner did he see the light than a most unnatural hatred took complete possession of his mother, that he was placed with a woman in the lowest state of indigence, with directions that he should be brought up in ignorance of his birth, and in the meanest condition, that the interference of his maternal grandmother, Lady Mason, a little alleviated his lot, and through her kindness he was placed at a grammar school in the neighbourhood of St Alban's, during which period Earl Rivers died, revoking a bequest he had made him, on being assured by the countess that her child had been some time dead, and that his mother endeavoured to have him kidnapped and sent as a slave to the plantations. He was an apprentice to a shoemaker (this is true) when the woman whom he had been taught to consider his mother, dying suddenly, some of Lady Mason's letters, among her papers, discovered to him, as he pretends, the secret of his birth, or, as appears probable, suggested to him the plan of assuming to be the child of Lady Macclesfield, whom his mother had nursed, and to whom these letters really related. He now became an author for the means of bodily subsistence. His first work was a pamphlet on the Bangorian controversy, which was followed by two comedies, *Woman's a Riddle* and *Love in a Veil*, which procured him the acquaintance of Sir Richard Steele and Wilkes the actor. In 1723 his tragedy on the subject of Sir Thomas Overbury was brought out, the author himself performed the principal character, but with little success, the profits of the piece, however, appear to have amounted to about £200. The poet was now rising in reputation, when, in 1727, in a broil in a house of ill fame, he killed a Mr Sinclair, and being tried for murder, a verdict of guilty was pronounced against him. Through the influence, however, of Lady Hertford, the king's pardon was granted him. In 1728 he gave to the public *The Bastard*, a poem of some merit. Soon after, Lord Tyrconnel (a nephew of his alleged mother) received him into his house, and allowed him £200 a year. In 1729 he published his *Wanderer* a Moral Poem. A quarrel with his patron once more turned him adrift upon the world. A Birth day Ode, addressed to Queen Charlotte in 1732, procured him a pension of £50 from the queen. In 1735 a satire against the clergy, entitled the *Progress of a Divine*, caused a prosecution to be instituted against him, but the information was dismissed. From this period he appears to have sunk into the lowest misery. The death of the queen and the loss of his pension completed his ruin, and although Pope and a few friends raised a subscription with a view of enabling him to reside in Wales, the same propensity to dissipation induced him not only to squander the money advanced to him, but to incur a debt of £8 at Bristol, for which he was arrested, thrown into the county jail, and

here, after a detention of some months, he died in 1743. Although Savage at one time received an allowance of £50 a year from Mrs. Oldfield, and repeatedly extorted considerable sums of money from Lady Macclesfield by threats of lampooning her, besides other sums from the admirers of his genius, his extravagance always kept him poor, and it is well known that he was the friend and companion of Johnson at the time when the latter was sleeping in the streets of London houseless and penniless. See Galt's *Lives of the Players*, Boswell's *Life of Johnson*, by Hill, &c.

SAVANNAH, a river of the United States, which forms the north east boundary of Georgia, and separates it from South Carolina. Vessels drawing 22 feet of water can ascend the river as far as Savannah (see next article), and smaller vessels can go up to Augusta, 231 miles from the mouth. The total length of the river is about 450 miles. The tidal wave ascends 45 miles.

SAVANNAH, a city and port of the United States, capital of Chatham county, Georgia, on the right bank of the Savannah river, 18 miles above its mouth, 115 miles south west of Charleston. The city is partly built on a bluff above the river. Its broad streets intersect each other at right angles, are shaded by fine trees, and lighted by electricity. Electric railways traverse the principal thoroughfares. Among the chief buildings and institutions of the city are the following: the United States government building, the city hall, the court house, a fine academy of arts with good collections, some fine churches, especially the Independent Presbyterian, Oglethorpe Hall, Hodgson Hall, containing the library of the Georgia Historical Society, club houses, &c. There are many public parks and squares, some of the latter adorned with monuments. The harbour of Savannah has been much improved since the Civil War, and is now an excellent one. It exports large quantities of cotton, rice, lumber, naval stores, fruits and vegetables, &c., and there are foundries and works for cleaning rice, manufacturing fertilizers, &c. The city was settled in 1733. During the revolution it was captured and held by the British. In 1864 General Sherman besieged it and captured it from the Confederates. John Wesley established the first Sunday school in America here. The city is the seat of a Roman Catholic bishop. Pop. (1880), 30,709, (1890), 43,189, (1900), 54,244.

SAVART'S WHEEL, an instrument for determining the number of vibrations which produce any given musical note. A toothed wheel, furnished with a counter to indicate the number of revolutions, is supported on a frame, and arranged to be driven by a band at high velocities from a rather heavy fly wheel, and a card is fixed on a frame so as to be struck by the teeth of the toothed wheel. If the wheel be turned slowly a click is heard from the card as each tooth strikes it, on increasing the speed the separate clicks are no longer heard, but a musical note is sounded, which rises in pitch as the velocity is increased. To use the instrument it is made to sound the particular note during some seconds, and the number of vibrations per second producing that note is given by the number of revolutions multiplied by the number of teeth and divided by the number of seconds. A modification of Savart's wheel has been employed by M. Fizeau to illustrate the effect produced when the vibrating body giving rise to a musical note is in motion. To a person in front of an approaching railway train the sound of the whistle is heightened in pitch, and to a person behind the train it is flattened. If a large ring having teeth on the inside be fixed, and if the card be made to sweep round against these teeth, a note will be produced depending on

the velocity of the card, but if the ear of the experimenter be placed in an extension of the plane of the ring the note will not be constant, for it will be heightened as the card approaches him, and it will be flattened as the card recedes from him. The note will only be constant when the ear of the experimenter is at a point equidistant from all the teeth of the ring.

SAVARY, ANNE JEAN-MARIE-RENÉ, Duke of Rovigo, the son of a French officer, was born at Marçay, in the department of Ardennes, in 1774. The outbreak of the French revolution determined him to adopt a military career, and in 1789 he entered an infantry regiment. In the early part of his service he incurred suspicion as a royalist, and narrowly escaped with his life, but he ultimately gave such proof of his adherence to the constitution as freed him from all charges on this head. He served under Custine, Moreau, and Desaix. The friendship of the last he had gained on the Upper Rhine, and he accompanied him on the expedition to Egypt. After the battle of Marengo he was appointed adjutant to Bonaparte (then first consul), and soon rose very high in his confidence by his bold, decisive, and manly conduct, more especially by his discovery of several private machinations which aimed at the overthrow of the existing order of things. His share in the execution of the Duke d'Enghien has never been properly explained, and is one of the darkest spots in his character. After rising gradually to the rank of lieutenant general he was finally rewarded, after the victory of Friedland, to which he mainly contributed, with the title of Duke of Rovigo. In 1808 the emperor sent him to Madrid, where he negotiated the perfidious arrangement by which the Spanish king and his son were kidnapped. In 1810 he succeeded Fouché as minister of police. During Bonaparte's residence at Elba he lived in retirement, but on his return immediately gave in his adhesion to him, and was appointed inspector general of *gens d'armes*. He remained true to Bonaparte in his misfortunes, and wished to have accompanied him to St. Helena. This was not only refused, but he was carried to Malta in 1815, and there detained till he managed to escape, after being a prisoner for seven months. While here he began his *Memoirs*. On obtaining his liberty he set sail for Smyrna, where he learned that he was condemned to death for having been one of those who had promoted Napoleon's return. Having gone to Trieste he was apprehended by the Austrian government, but set at liberty, and allowed to return to Smyrna. After various other vicissitudes he returned to Paris, and gave himself up for trial. The able defence of Dupin obtained his acquittal. On the accession of Louis Philippe he succeeded in obtaining public employment, and in 1831 became military commander of Algiers in place of Clausel. Having been recalled in 1833 he returned in bad health, and died in the course of the same year.

SAVE, or **SAU**, a river of Austria, which rises in the east slope of the Julian Alps, flows south east through Illyria, and along the south of Styria into Croatia, on reaching the frontiers of which it becomes very circuitous, though flowing mainly *e s e*, and after a course of about 540 miles joins the left bank of the Danube at Belgrade. Its chief tributaries, all on the right, are the Kulpa, Unna, Verbas, Bosna, and Drina. The first part of its course is between narrow and steep banks, in the lower part, where it forms the boundary between Austria and Servia, it flows through flat plains, which it often devastates by inundation. It becomes navigable below the confluence of the Kulpa, and furnishes a most important outlet for the produce of the districts watered by it.

SAVERNE (German, *Zabern*, ancient, *Taberna*), a town of Germany, in Alsace, on the Zorn, 19 miles north-west of Strasburg. It is an ancient place, and acquired some importance under the Romans, was afterwards fortified, and stood various sieges during the Thirty Years' War. It is irregularly built, has a church with an ancient and lofty tower, an old episcopal palace, which has been converted into barracks, and a prison. The manufactures are grindstones, agricultural implements, iron ware, leather, &c., and the trade is in iron ware, tobacco, and wood. Pop (1895), 8322.

SAVIGLIANO, a town of Northern Italy, in the province of Cuneo, pleasantly situated on the Maira, 8 miles east of Saluzzo. It is well built, is surrounded by ancient walls and towers, and has several spacious streets, with others of an inferior description. The chief church contains paintings by Mulinari Caraccino. There is also a Benedictine abbey and a fine market square. The manufactures are woollen, linen, and silk goods, &c. Pop 10,000.

SAVIGNY, **FRIEDRICH KARL VON**, a German jurist, was born at Frankfort on the Main, 21st February, 1779. Left without parents or near relations when he reached the age of thirteen, he was sent by his guardian to the University of Marburg in 1796. He earnestly devoted himself to the study of jurisprudence, and took his degree in 1800, after which he delivered lectures on his special branch of study to a numerous auditory. In 1803 he published his first work, *Das Recht des Besten*, which was translated into English by Sir Erskine Perry. In 1804 he married Kunigunde, the sister of Clemens Brentano and of Bettina von Arnim, and soon after quitted Marburg to prosecute researches in the libraries of France and Germany with a view to a historical development of the glosses of commentators on Roman law. In 1808 he became professor of law in the University of Landshut, in Bavaria, and two years later was called to fill the chair of jurisprudence in the newly established University of Berlin, where he continued to lecture with uninterrupted success for a period of thirty-two years. In 1811 he was elected a member of the Prussian Academy of Science, was appointed a councillor of state in 1817, and in 1842 minister of justice for the revision of the law. He retired into private life in 1848, and died in Berlin 25th October, 1861. His principal works are *Geschichte des römischen Rechts im Mittelalter* (six vols., Heidelberg, 1815-31), *System des heutigen römischen Rechts* (eight vols., Berlin, 1810-48), to which *Das Obligationenrecht* (two vols., Berlin, 1851-53) forms an appendix, *Vermischte Schriften* (five vols., Berlin, 1850), a collection of essays which had appeared in legal periodicals.

SAVILLE, or **SAVILLE**, **GEORGE**, Marquis of Halifax, a statesman and writer, was born at Thornhill, Yorkshire, on Nov. 11th, 1633. On the death of Cromwell he distinguished himself by his exertions in favour of the absent king, and in 1668 he was raised to the peerage as Baron Savile and Viscount Halifax. In the following year he was appointed a commissioner of trade, and in 1672 he was sworn of the council. He was removed from the council in 1676 through the influence of Danby, whose enmity he had incurred. In 1679 he became a member of the council of thirty proposed by Temple, and in this year also he was created Earl of Halifax. He had given a certain amount of support to Shaftesbury, but when the bill for excluding the Duke of York from the succession was in agitation his repugnance to that measure brought him into disgrace with the party with which he had hitherto acted. In 1682 he was created Marquis of Halifax and lord privy seal. Under James II. he was made president of

the council, but he was soon after expelled from the council because he opposed the repeal of the Test and Habeas Corpus Acts. From this moment Lord Halifax continued in opposition till the flight of James II., when he was chosen speaker of the House of Lords in the Convention Parliament, and contributed mainly to the elevation of William III. to the throne. Early in 1689 he was appointed lord privy seal, but he soon afterwards resigned this office. During the remainder of his life he often voted against the court. He died on April 5, 1695. He was the author of *Advice to a Daughter* (1688), and of a variety of political tracts, the principal of which are *Maxims of State*, *The Character of a Trimmer*, *Character of King Charles II.*, *Anatomy of an Equivalent*, *Letter to a Dissenter*, &c. See Macaulay's *History of England*.

SAVILLE, **SIR HENRY**, one of the most learned scholars of his age, was born at Bradley, near Halifax, Yorkshire, on Nov. 30, 1549. He was educated at Brasenose College, Oxford, removed on a fellow-ship to Merton College in 1565, and graduated B.A. in 1566, M.A. in 1570. In his twenty-ninth year he made a tour on the Continent, where he collected manuscripts and made the acquaintance of scholars, and on his return was appointed tutor in Greek to Queen Elizabeth. In 1585 the wardenship of his college, which he held for about six and thirty years, the provostship of Eton being added to it in 1596, was conferred on him. He was knighted by James I. in 1604. In 1619 he founded two professorships in geometry and astronomy at Oxford, besides conferring several other valuable benefactions, both in property and books. Among his works the principal are his *Commentaries on Roman Warfare* (1591), *Rerum Anglicarum post Bedam Scriptores* (1596), *Praelectiones in Elementa Euclidis* (1621), and his edition of the writings of St. Chrysostom (1610-13), in eight folio volumes, a work on which he is said to have spent £8000. Sir Henry Savile was the correspondent of J. Scaliger, Meibomius, Isaac Casaubon, and most of the learned men of his day. He died at Eton on Feb. 19, 1622.

SAVIN. See **JUNIPER**.

SAVINGS BANKS. See **BANK**.

SAVONA, a seaport of Northern Italy, in the province of Genoa, capital of the district of its own name, at the foot of a hill on the west side of the Gulf of Genoa. It is charmingly situated amid lemon and orange gardens, and consists mostly of narrow streets, and a great number of indifferent with some substantial houses. The principal edifices are a majestic cathedral, adorned with pictures, bass-reliefs, sculptures, and carvings, several other richly decorated churches, a lyceum, two gymnasiums, a technical institute, a royal institute for the merchant marine, an episcopal seminary, a handsome theatre dedicated to the poet Chabrerera, who was born here, and a large hospital. The industries include pottery, ropes and sails, ship building, machinery and iron goods, leather, soap, &c. A considerable trade is carried on at its harbour, which is good, and defended by a fort. Pop. Sixtus IV. and Julius II. were born here. Pop. 19,500.

SAVONAROLA, **GIROLAMO**, the celebrated political and religious reformer of Florence, was born at Ferrara, September 21, 1452, and was designed for the medical profession. Religious enthusiasm led him to leave his father's house secretly and enter the order of the Dominicans at Bologna, 24th April, 1475. Several years later he began to preach at Florence, but with so little success that he determined to abandon the pulpit, and, retiring to Bologna, he devoted himself to metaphysical and physical

studies. The reputation of his talents and learning induced Lorenzo de' Medici to invite him to return to Florence. Here Savonarola began to preach again, and his discourses attracted such crowds that the church could not contain them. His extraordinary sanctity and his powerful eloquence gained him great influence over the minds of the Florentines, and he was emboldened to assume a prophetic tone, and to urge with vehemence, and in public, the necessity of a reform in the church. The multitude looked upon him as divinely inspired, while some ridiculed him as a fanatic, and others denounced him as an impostor. Florence was then enjoying peace and material prosperity under the administration of Lorenzo, and all Italy was quiet, yet Savonarola startled his hearers by foretelling the irruption of fierce foreign hosts which would bring bloodshed and desolation over the land. A few years later this prophecy was fulfilled by the invasion of Charles VIII of France and his ruthless bands. He soon broke off all connection with his patron Lorenzo, whose character he assailed with prophecies of his approaching fall. He refused to make the customary visit to that chief, which it was his duty to do as prior of St Mark's, and when Lorenzo went himself to St Mark's refused to see him. Although Lorenzo de' Medici was repeatedly urged to adopt severe measures against him he refused, either from lenity or from his respect for the character of the preacher. When Lorenzo lay on his death-bed (1492) Savonarola obtained admission to him, and according to Pico de Mirandola refused to grant the dying man absolution, though this statement is not borne out by Poliziano's account of his patron's death. After the death of Lorenzo and the expulsion of his son Piero, Savonarola took the most active part in the political affairs of Florence. He put himself at the head of those who demanded a more democratical form of government, asserted that God had commissioned him to declare that the legislative power must be extended to the citizens, that he himself had been the ambassador of the Florentines to heaven, and that Christ had consented to be their king. The newly elected magistrates accordingly laid down their offices, and the legislative functions were intrusted to a council of the citizens, which chose a committee of their own number for the discharge of the duty. Dissensions, however, distracted the new republic, the aristocratical and democratical parties persecuted each other with great fury, the former, the *Arrabbiati* (the Enraged), consisting of the friends of the old order of things, and the latter, the *Piagnoni* (Weepers), of the devout admirers of the monk. But the zeal of Savonarola was not content with revolutionizing Florence, he meditated the reform of the Roman court and of the irregularities of the clergy. The pontificate of Alexander VI (Borgia) could not fail to supply causes of complaint on both heads. He accordingly wrote, as his eulogists assure us, to the Christian princes, declaring that the church was going to ruin, and that it was their duty to convoke a general council, before which he was ready to prove that the church was without a head, and that the reigning pope was not a true bishop, had never been worthy of the title, nor even of the name of a Christian. Alexander excommunicated him, and the bull of excommunication was read in the cathedral at Florence, but Savonarola despised the thunders of the Vatican, and continued to preach. His influence was still further increased by the failure of an attempt of Piero de' Medici to restore his family authority. But another party had meanwhile arisen in opposition to him. His innovations in St Mark's and other monasteries had excited the enmity of the monks, especially of the Franciscans of the strict observance, who denounced him from the pulpit

as an excommunicated heretic. Fra Domenico da Pescia, a monk of his convent, offered in the heat of his fanatical zeal to prove the truth of his master's doctrines by passing through fire if one of his opponents would undergo the same ordeal in defence of their opinions. The challenge was accepted by a Franciscan monk, and Savonarola, with his champion, appeared at the head of a large procession, chanting Psalm lxxviii, 'Let God arise, and let his enemies be scattered.' The Franciscan also presented himself, the fire was kindled, and Domenico was ready to enter the flames, bearing the host in his hands. But the crowd exclaimed against this sacrilege, as they termed it, and as Domenico persisted in his determination he thus happily escaped the ordeal for which he had offered himself. But this event was fatal to Savonarola. The people loaded him with insults, and he was finally thrown into prison. A spiritual court, under the direction of two Papal commissioners, was held for his trial. His firmness and eloquence at first threw his judges into confusion, but being examined on the rack he confessed that he had falsely arrogated supernatural powers. He was condemned, with two of his adherents, Fra Domenico da Pescia, and Silvestro Maruffi, to be first strangled and then burned, and the sentence was executed, May 23, 1498, in presence of a large multitude, some of whom considered him as a martyr and a saint. This extraordinary man left, besides letters, a Treatise against Astrology, and several philosophical and ascetical works (*Opera*, Lyons, 1633-40, six vols.) His sermons (*Prediche*, Florence, 1496), though wanting in the characteristics of finished discourses, contain powerful and stirring passages. See Madden's *Life of Savonarola* (two vols 8vo, 1854), Roscoe's *Life of Lorenzo de' Medici*, P. Villari's *Storia di G. Savonarola* (Florence, 1860, 2nd edition, 1887, Eng trans., 1888), Clark's *Savonarola* (2nd edition, 1890). In George Eliot's *Romola* is given what is believed to be a very faithful portrait of Savonarola.

SAVOY, *DUCHY OF* (Italian, *Savoja*, French, *Savoie*), formerly a division of the Sardinian States, now forming two of the departments of France, bounded on the north by Switzerland, from which on that side it is almost entirely separated by the Lake of Geneva, on the north east by Switzerland, on the east and south east by Piedmont, and on the south and west by the French departments of Isère and Ain, length, north to south, 92 miles, breadth, 66 miles, area, 3597 square miles. Savoy is one of the most mountainous countries in Europe, Mont Blanc lying within its territory in connection with the loftiest chain of the Alps, which stretch along its eastern and southern frontier, and sending out numerous ramifications in all directions, make its surface almost a continued succession of lofty mountain and valley. It belongs entirely to the basin of the Rhone, which, forming its western boundary, there receives its drainage directly, while the drainage of the north is transmitted to it chiefly by the Lake of Geneva and the Arve, and that of the south chiefly by the Isère and its tributary the Arc. The lakes are not numerous, and, with exception of that of Geneva, which is shared with Switzerland, not individually of large extent. The most important are those of Bourguet and Annecy. The climate is in general cold, the winters are long and severe, and the summers frequently follow without an intermediate spring. From the physical structure of the country the extent of arable ground is necessarily limited, but in ordinary years, with the aid of chestnuts, which forms an important part of the food of the lower orders, the grain raised nearly meets the consumption. In favoured spots, particu-

larly in the north, in the lower valleys and slopes, the vine is cultivated with success. But the chief riches of the country are in its cattle and dairy produce, a large proportion of the surface yielding nothing but hay or pasture. The timber, too, which clothes many of the mountain steepes up almost to the limits of vegetation, is of great consequence, beyond these limits is a still higher region of perpetual snow and ice, where both vegetable and animal life are all but extinct. The minerals include iron, copper, silver, lead, and lignite, but seldom in such quantities as to make the working of them important, the rock-crystals found are often remarkable for their size and beauty. The manufactures consist chiefly of coarse woollens, linen and cotton goods, felt hats, leather, and hardware. The trade, so far as derived from native resources, is almost confined to cattle, skins, wool, and dairy produce, but there is an important transit trade carried on across the country between France and Italy, chiefly by way of Mont Cenis. The Savoyards are industrious, honest, hospitable, and intelligent, fond of their country to an extraordinary degree, and unwilling to leave it permanently, though about 30,000 of them find winter employment in France, Switzerland, Italy, and Spain. The greater part return early in summer, but some wait until they have amassed enough of wealth to enable them to pass the rest of their years at ease in their native country. Education is in a prosperous condition, nearly every commune having at least one primary school, and both primary and secondary schools being free. By treaty of 24th March, 1860, Savoy was ceded by Sardinia to France, of which it now forms two departments, Savoie, area 2224 square miles, pop (1901), 249,460, and Haute Savoie, area 1667 square miles, pop 259,595. Savoie is divided into the four arrondissements of Chambéry, Albertville, Moutiers, and St Jean de Maurienne. Its capital is Chambéry. Haute Savoie is divided into the four arrondissements of Annecy, Bonneville, St. Julien, and Thonon. Its capital is Annecy. Under Sardinia it was divided into the provinces of Chambéry, Upper Savoy, Maurienne, Tarentaise, Annecy, Faucigny, and Chablais.

SAVOY, HOUSE OF. The territory of Savoy formed part of ancient Gaul, and from 122 B.C. to 407 A.D. was in possession of the Romans, by whom it was divided into two provinces, the Graian and Pennine Alps. At the latter date it was seized by the Burgundians, but along with Burgundy it became subject to the Franks in 534, was included in the Carolingian Empire, and on its dissolution in 887 was granted by the Diet of Tribur to Rudolph, king of Transjurane Burgundy, and along with that kingdom was united to Cisjurane Burgundy or Arles. On the accession of the last king of Arles to the imperial throne as Conrad II in 1027, the more powerful nobles of North-western Italy, such as the Marquis of Susa, the Counts of Maurienne, Turin, and Chablais, became vassals direct of the emperor. Humbert White Hand (Umberto Blancamano, Count of Maurienne), the reputed descendant of Wittekind, the last of the Old Saxon kings, was the first of the family, who, by the addition of Chablais and Valais (grants of Conrad II) to his hereditary lordship, took a prominent place among the princes of Northern Italy. His nephew, Amadeus II. (1060-80), in right of his mother, Adelaide, heiress to the Marquisate of Susa, added nearly the whole of Piedmont to the original possessions of his house. Humbert II, his son and successor (1080-1103), further increased his dominions by the conquest of Tarantasia. Amadeus III. (1103-49) received from the Emperor Henry V. the title of Count of Savoy in 1111, and his grandson, Thomas I. (1188-1233), who supported

Frederick II in his contest with the pope, obtained important accessions in Chambéry, Turin, Vaud, and other lordships. Amadeus IV. (1233-53), like his father a warm adherent of the emperor, obtained the submission of the city of Turin to his rule, and ceded Piedmont to one of his brothers, Thomas, count of Maurienne. He was succeeded by Boniface (1253-63), who died childless, leaving the crown in the hands of his uncle, Peter (1263-68), who ousted the rightful heir, then a child. Before ascending the throne, Peter for nine years served Henry III. of England, who bestowed on him the earldoms of Richmond and Essex, he won the surname of Charlemagne the Little, inherited the district of Geneva, and reconquered Turin, which had rebelled. His nephew Amadeus V., the dispossessed prince (1285-1323), now mounted the throne, he assisted Philip the Fair in his war against Flanders, accompanied the emperor Henry VII. to Italy, received from him the lordships of Asti and Ivrea, and added Lower Faucigny to his domains. His grandson Amadeus VI. lent his aid to the Greek emperor John Palæologus against the Turks and the Bulgarians, accompanied the pretender Louis of Anjou in his expedition to Naples, and united the lordships of Cherasco, Com, Gex, and Valromey to his possessions. His son, Amadeus VII. (1388-91), forced the Count of Provence to cede to him Nice and Ventimiglia. Amadeus VIII., grandson of the preceding (1391-1451), received the ducal title from the Emperor Sigismund in 1416, acquired the county of Geneva, together with Bugey and Vercelli, and re-annexed Piedmont, which had been for more than a century and a half in the possession of a younger branch of the family. (See AMADEUS VIII.) Louis, who on the abdication of his father had governed as regent, assumed the title of duke in 1440, married Charlotte, the daughter of the king of Cyprus, through whom the family of Savoy acquired the title of King of Cyprus and Jerusalem, first borne by Charles I. (1482-89). The elder male line became extinct in 1496, and the crown devolved on the nearest collateral heir, Philibert II. (1496-1504) and his brother Charles III. (1504-53). The latter aided the Emperor Charles V. against Francis I. of France, and after losing Valais and Geneva, which joined the Swiss Confederation in 1533, and the canton of Vaud, which was seized by the Bernese in 1536, he was finally deprived of all his territories by the French king. But his son Philibert Emmanuel, surnamed the Iron Head (1553-80), who had gained great distinction and influence as commander in chief of the Spanish army, succeeded in gaining back the greater part of the paternal domains by the treaties of Câteau-Cambrésis (1559) and Lausanne (1564). In 1560 he was induced by the courts of Rome, Spain, and France to attempt the conversion of the Waldenses by force, but they offered such vigorous resistance to his troops in several encounters that he granted them, under certain conditions, the free exercise of their religion (5th June, 1561). Charles Emmanuel I. (1580-1630) was prompted by an unruly ambition to reconquer the marquisate of Saluzzo, which had not been restored to his father, a project which the civil war in France seemed to favour. His short term of success was cut short by Henry IV. of France, who invaded Savoy and Piedmont, and compelled the duke to give up the territories of Bugey, Valromey, and Gex. His son, Victor Amadeus I., speedily regained the possessions his father had lost, and added to them Montferrat, Alba, and some other places, surrendering to France in exchange Pignerol, La Perouse, Angone, and Lucerne. His younger brother Thomas was the founder of the line of Savoy-Carignan. Victor Amadeus II. (1675-

1730), grandson of the first of that name, at the beginning of the war of the Spanish Succession sided with France, but, bribed by brilliant offers, he allied himself to Austria by the Treaty of Turin, 25th October, 1703. The victories of the Duke of Vendôme compelled him to retire to Genoa, but the defeat of the French under the walls of Turin by Prince Eugene (7th September, 1706) restored his possessions. In 1709 he severed the Austrian alliance, and remained neutral till the end of the war. By the Treaty of Utrecht (1713) he received a part of the Duchy of Milan, along with the island of Sicily, which conferred upon him the title of king. In 1720 he was compelled to give up Sicily to Austria in exchange for Sardinia, which, along with Savoy, Piedmont, and his other continental dominions, were erected into the Kingdom of Sardinia. See SARDINIA.

SAVOY CONFERENCE, an ecclesiastical conference held in 1661 at the Savoy Palace, London, between a number of Episcopalian and Presbyterian divines, for the purpose, as the royal letters patent that summoned the meeting have it, of 'advising upon and reviewing the Book of Common Prayer, and of taking into serious consideration the several directions and rules, forms of prayer, and things in the same book, of consulting also upon the several objections which shall now be raised against the same, and, if occasion need be, to make such necessary and reasonable alterations, corrections, and amendments as shall be agreed upon to be needful and expedient for the giving satisfaction to tender consciences, and the restoring and continuing of peace and unity in the churches under his majesty's government and protection.' When the parliamentary cause triumphed in the civil war of 1642-46 the majority of the clergy, who were ardent royalists, were either turned out of their pulpits or fled, and their places were filled by Presbyterians, then a strong body in England, and at the Restoration of Charles II a large number of the ministers connected with the church strongly objected to Episcopalian order and practice being again introduced. The government was fully aware of this state of matters, but was at first unwilling to adopt stringent measures, and it was accordingly resolved that the final determination of all matters appertaining to the establishment of a perfect and entire unity and union throughout the nation should be left to the advice of a national synod, to be duly called after a little time should have cooled men's tempers down to the requisite calmness for such consultations. On the 25th March, 1661, therefore, the letters patent above quoted from were issued, appointing twelve bishops, with nine clergymen as assistants on the Episcopal side, to meet with an equal number of Presbyterian divines, and discuss the matters therein mentioned. Among the Episcopalian commissions were Frewen, archbishop of York, Sheldon, bishop of London, Cosins of Durham, Morley of Worcester, Gauden of Exeter, Reynolds of Norwich, &c., with their assistants Doctors Heylin, Barwick, Gunning, Pierce, and Pearson. Their opponents were the most eminent men of the Presbyterian party, Richard Baxter, Edmund Calamy, Dr Wallis (then Savilian professor of geometry at Oxford), William Spurstow, Matthew Newcomen, and others. The commissioners met for the first time on the 13th April. Sheldon opened the discussion by observing that the Episcopal party, being perfectly satisfied with the established forms of worship, had nothing to propose, and would therefore expect that any objections to the existing order of things, and any innovations that might be desired, should be mentioned by their opponents. The Presbyterians moved that Bishop Usher's

Reduction of Episcopacy, a scheme in which the elements of the Scotch system of presbyteries, synods, and general assemblies were combined with distinctions of ecclesiastical ranks, should be laid down as a groundwork to treat upon. They further offered several exceptions to the liturgy, against the many responses of the people, and desired that all might be made one continued prayer. They objected to lessons being taken out of the Apocrypha, and wished that the psalms used in the daily service should be according to the new translation. They excepted to many parts of the baptismal service that infer the doctrine of the regeneration of the baptized. They also moved that the practice of kneeling at the lord's supper, and that the use of the surplice, the cross in baptism, of godfathers as sponsors, and the celebration of the holy days, should be abolished. It was urged in reply to the demand for the adoption of Usher's scheme, that the king's commission gave them no power even to take into consideration any questions relating to the government of the church. Thus baffled in their first attack, the Presbyterians proceeded to discuss the minor points, mainly the alterations in the liturgy. Baxter, with the approval of his party, undertook the preparation of what was called a Reformed Liturgy, but the Episcopalian commissioners rejected it at once, without examining it. The two parties finally separated at the end of four months, the period assigned by the letters patent, without coming to a single resolution, and the government, never very friendly to Presbyterianism, passed in the following year the famous act of uniformity, the stringent clauses of which drove about 2000 clergymen from the Anglican Church.

SAVU, SAVOU, SAVOE, or SAROE, an island in the Asiatic Archipelago, between the island of Timor and Sandal wood Island, about 21 miles long, east and west, and 13 broad, area, 237 square miles, low to seaward, with hills of moderate height in the centre. At each extremity of the island there are low sandy points with heavy breakers. It is well-watered and fertile, yielding millet, maize, beans, water melons, sugar cane, cotton, tobacco, indigo, betel, and cinnamon, with cocoa nuts, tamarinds, mangoes, lemons, &c. Buffaloes, goats, sheep, horses, swine, dogs, and cats are plentiful, there are a few wild boars and deer, and superabundance of fowls, fish, and turtle. It is divided into five native principalities, all of which are subject to the Dutch government of Timor. The inhabitants are a strong well built people, of the Malayan race, both sexes practise tattooing. The religion is a traditional paganism, and sacrifices of dogs are frequently offered up. Pop 16,000. A little to the south-west is the uninhabited island of New Savu.

SAW-FISH (*Pristis antiquorum*), a genus of fishes belonging to the order Elasmobranchii, and included in the family or section of the Batides (Skates, Rays, &c.). The name of this fish is derived from the curious development of the snout, which is prolonged to form a flattened sword like structure, the sides of which are armed with spines, so as to give the snout somewhat the appearance of the blade of a large doubled-toothed saw. The saw-like teeth or spines are largest towards the point of the structure, the surface of which is covered by small scales of a granular or placoid character. Armed with this formidable weapon, which may measure from 2 to 3 feet or more in length, the saw fish is said to attack even the large Cetaceans or Whales, and to inflict severe and even mortal injuries upon them, whilst it is certainly destructive to shoals of small fishes. The true teeth of the mouth form a pavement-like arrangement, and do not attain a great development. The skin is covered by hexa-

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gonal, placoid scales, arranged in a mosaic-like manner. This fish attains a length of from 12 to 18 feet, inclusive of the saw. The mouth is situated on the under surface of the head, and the spiracles or breathing apertures are large and set behind the eyes. These fishes are widely distributed through the ocean. The colour is dark-gray, or black above and white beneath, the sides being of an intermediate tint. The saw fish seldom comes near land, but occasionally may be cast upon the shores. The tail-fin is of heterocercal shape, and the first dorsal is placed above the ventral fins. Another Saw-fish (*Pristiophorus cirratus*) is placed among the sharks. (See fig at ICHTHYOLOGY.)

SAW-FLIES, a group of insects belonging to the order Hymenoptera, and distinguished by the peculiar conformation of the ovipositor of the females, which is composed of two broad plates, serrated or toothed along their edges. Two horny plates protect this saw-like organ, which is further received within the modified terminal joint of the insect's abdomen. By means of their saws the female insects incise the stems and leaves of plants, and deposit their eggs within the slits thus formed. A drop of fluid is inserted at the time of depositing the egg, and this fluid is supposed to irritate the plant tissues and to cause them to swell, and thus to form a kind of gall, in which the larva lives, and upon the substance of which it feeds.

The group Tenthredinidae is that which includes the best known species of saw flies. The genus *Cimbex*, of which the *C. femorata* is a familiar species, is a representative group, the larvæ of which possess twenty-two feet, and are noted as discharging a greenish fluid from certain pores or openings situated on the sides of the body. The Turnip fly (*Athalia centifolia*) is one of the saw flies, the larvæ being known as 'Niggers' on account of their black colour. The Gooseberry-fly (*Nematus grossulariæ*) is another of the saw flies and possesses blackish gray larvæ, which are exceedingly destructive to the leaves and tissues of gooseberry bushes. *Cimbex* possesses two united joints in the club of the antennæ, *Athalia* possesses antennæ of nine or ten joints, and *Nematus* has nine jointed feelers and simple tarsi. (See illustrations at ENTOMOLOGY.)

SAWS AND SAWING MACHINERY The saw is a well known and important tool, usually made of a steel plate, with teeth along its edge, for cutting wood, horn, ivory, bone, the metals, &c. This tool is operated by hand and machinery. Hand saws may be classed in the following variety and order for wood—The rip, cross cut, panel, tenon, fret, bow, and port. The chief types of machine saws are—the circular, the frame or mill saw, and the band. Power driven saws are generally, with the exception of the 'ground off' or 'swage' circular saw, uniform in thickness, but varied gauges of thickness are used suitable to the work. The B.W.G. (Birmingham Wire Gauge) of circular saws varies from 22 in swage saws, to 7 and 8 for large break down saws. The form of teeth in both hand and machine saws must be different to suit the respective work and the nature of the material they are to operate upon. Thus, a hand cross cut should have about 5 points to the inch for hardwood, and 4 points for soft woods. The more acute the angle or bevel on the face of cross saw teeth, the sweeter and easier will they perform their work. Hand rip-saws have generally from 3 to 4 points to the inch, these teeth should be sharpened dead square on face, with as much rake as possible. In usual practice with hand rip saws, the angle of teeth is 90° on face, but more rake than this can consistently be given. Panel and tenon saws are for finer work than the

above, consequently the number of teeth to the inch are from 8 to 12. The form of teeth for these fine saws is usually a medium between the ordinary rip and cross cut. The side and face of all the above hand-saws should be sharpened simultaneously, which can simply be done with a triangular file. The lance tooth for hand cross cut saws is a very good and rapid form for dealing with softwood, but cannot withstand the strain encountered in sawing hardwood or knotty pine. The best mill saws are cut out of a sheet of steel formed by rolling an ingot of the cast metal. The edges of the pieces are then ground true, and the teeth are cut by a punch at a fly-press, their distances apart being regulated by a gauge. The rough edges left by the punch are rubbed off with a file, and the teeth are sharpened. The blades are next hardened by being heated to a red-heat in ovens, and then plunged horizontally and edgewise into a bath of oil, mixed with tallow, suet, bees' wax, resin, pitch, &c. To remove the excess of hardness acquired, a portion of the composition which adheres to them is wiped off, and each saw is held over a coke fire until the remaining grease ignites, this is called 'blazing off'. The temper is regulated by the quantity of composition blazed off, the smaller the quantity the harder the temper. The blade is allowed to cool, and is then hammered over every part of its surface on a polished steel anvil to give it a uniform tension and elasticity throughout. The surface is next ground on a wet grindstone in order to reduce the thickness of the metal from the teeth towards the back. Small blades are held against the stone by means of a board placed upon them, the larger blades are suspended at both ends from the roof of the mill. The finishing processes consist of rehammering, or as it is called, replanishing, holding the blade over a coke fire until it becomes of a faint straw colour, passing lightly over the grindstone to remove the hammer marks, and then polishing on hard smooth stones and with emery. In regard to machine saws the action of the band and the circular is continuous, and each tooth, when the tool is properly trimmed, should have the same amount of work to perform, but as the action of the frame saw is intermittent, no two of the teeth while in action get an identical amount of work. Yet the teeth which perform no work (when the log is not deep enough to cover the entire blade) have to be filed or ground down to the same extent as the teeth which do most work. Without a positively straight and uniform face the blade will not accomplish its work in an accurate manner. The teeth of saws for cutting iron, stone, ivory, &c., are of a special type, & they are stouter and more numerous, the plate for this class of work is also much thicker than is necessary for wood. For stone-sawing the best tooth is the diamond inserted tooth, & real diamonds are inserted in the cutting parts of teeth. This is certainly an expensive system so far as first cost is concerned, but as the diamond is perhaps the only material hard enough to withstand the stress of stone cutting, the results are found profitable and satisfactory. In general, the softer the material, the acuter are the teeth of the saw chosen to cut it. The more likely the material is to clog, the wider must the set of the teeth be, but if the waste of the wood is a consideration, and also the greater amount of labour in making a wide cut, the set should be as little as possible.

Saw-teeth for timber working also require set, & each alternate tooth has to be bent a little to the side. This relieves the blade while in action, and prevents the undue friction which otherwise would take place. Small band-saws need considerably different treatment as regards trimming from either

circular or mill saws. The setting of band-saws is performed in several ways, the most rapid and exact method being by a special machine, which will set the teeth at the rate of some 200 per minute. In recent years the band saw has been employed for cutting cold iron and steel, as well as converting the most heavy logs. The log band-saw, or band mill, is used both vertically and horizontally, the best results being obtained from the latter type. The most modern band mills can convert logs into boards $\frac{1}{2}$ to $1\frac{1}{2}$ inch thick at the rate of some 1000 superficial feet per hour. The vertical reciprocating frame with 26 to 30 saws operating at once can convert logs into board wood at the rate of about 2000 superficial feet per hour in softwood, and 1000 feet in hardwood. A circular saw having a continuous feed can convert deals into boards at a speed of some 1400 superficial feet per hour. Modern automatic feeds are applied to all these machines. The circular saw has four different feeds, according to the type of bench—(1) the continuous vertical roller feed, (2) the drag feed, (3) the horizontal roller feed, and (4) the rack and pinion feed. Vertical sawing frames have two distinct feeds, viz the continuous and intermittent, the latter being the best and most practical. Horizontal sawing frames and the log band mill have but one type of feed, namely, the continuous. Circular saws have usually a periphery or rim travel of 9000 feet per minute, reciprocating frame saws from 250 to 300 feet, and log band saws 6000 to 7000 feet per minute.

In the plate are illustrations which give a comprehensive idea of sawing machinery—chiefly for wood. 1 represents a good type of jobbing band saw machine. The table of this machine can be tilted to any angle for bevel cutting. It is also furnished with fence guides and spring tension, which is better than gravitation or lever tension. Fig 2 shows a high speed fret cutting machine, these are driven at 600 to 800 revolutions per minute. To briefly describe the plate reciprocating machinery is represented in 2, 4, 5, 6, 8, 10, 12, and 13, circular by 3, 7, and 9, and band by 1 and 11. Circular saws, which are driven by machinery, did not come into general use until the beginning of last century. Saws of this kind commonly run in a slit through a table, upon which the material to be sawn is placed and pushed on against the descending teeth. The teeth cut all round the edge of the disc all point the same way, and act continuously as the saw revolves on its axis, the saw is made to revolve with great rapidity, and as the teeth are made well apart and inclined almost to a claw shape, they cut the wood with great effect. The harder the wood the smaller and more upright should be the teeth, and the motion the faster. The teeth are more set than in rectangular or straight saws, since the large circular plate cannot be made so true, nor keep so true, as the narrow straight blade.

Saw-mills seem to have been erected in some parts of Germany as early as the fourth century, but do not appear to have been common on the Continent till about ten centuries later. The first attempts to introduce them into England, in the seventeenth century, were violently opposed, as it was apprehended that the sawyers would be deprived by them of the means of earning a living. It was not until more than a hundred years later that saw mills were allowed to work without molestation by the mob.

SAXE, HERMANN MAURICE, COMTE DE, Marshal-general of France, was the natural son of Augustus II, king of Poland, by Aurora, countess of Konigsmark. He was born at Dresden in 1696, and even in childhood gave some evidences of his warlike genius. At the age of twelve he joined the allied

army under the Duke of Marlborough and the Prince Eugene, and was present at the sieges of Lille and Tournay. His father then gave him a regiment of cavalry, with which he served in Sweden, and was at the taking of Stralsund. His mother procured his marriage with a German lady of rank when he was but fifteen, but the inconstancy of his temper, and his numerous love intrigues during a long stay in Dresden, occasioned a divorce after a few years. After the Treaties of Utrecht and Passarowitz he withdrew to France, and was permanently attached to the service of that country by a brevet of *maréchal de camp*, given him in 1720 by the Regent Duke of Orleans. He applied himself to study at Paris, and made himself intimately acquainted with professional tactics. In 1726 he was a candidate for the Duchy of Courland, and he formed various other schemes of ambition at different periods. On the death of his father he declined the command of the Saxon army, offered him by his brother Augustus III, and joined the French on the Rhine under the Duke of Berwick. He distinguished himself at Dettingen and Philippsburg, and in 1744 was rewarded with the staff of a marshal of France. He was employed in the war that followed the death of the Emperor Charles VI, and in 1745 gained the famous battle of Fontenoy, which was followed by the capture of Brussels, and many other places in Flanders. In 1747 he was victorious at Laufeldt, and in the following year took Maestricht, soon after which the Peace of Aix la Chapelle was concluded. Marshal Saxe survived that event a little more than two years, dying November 30, 1750. He wrote a treatise entitled *Mes Réveries, on the art of war* (two vols, quarto). He had a splendid physique, which he ruined, however, by his debaucheries, was a brave soldier, and was declared by Frederick the Great to be the 'Turenne of Louis XV's age, a general fit to teach all the generals of his time.' He was offered one of the chairs of the French Academy, but declined the honour in a note which certainly justified his non acceptance. He wrote, showing a lofty independence of the ordinary orthography, '*Il s'euille me fere de la cadence, cela m'iet come une bage à un chas*'. See Carlyle's *Frederick the Great*, Karl von Weber's *Moritz von Sachsen* (Dresden, 1863, 8vo), and Duc de Broglie's *Maurice de Saxe et le Marquis d'Argenson* (Paris, 1891-93).

SAXE-ALTENBURG. See ALTENBURG.

SAXE COBURG GOTHA (German, *Sachsen-Koburg Gotha*), a duchy of Central Germany, one of the states of the German Empire, comprising the province of Gotha, lying between Prussia, Schwarzburg, Meiningen, and Weimar, and the province of Coburg, lying between Meiningen and Bavaria. The duchy contains altogether about 760 square miles, the area of Coburg being 218 square miles, and that of Gotha 542 square miles. Coburg is traversed by the Itz and Rodach, Gotha by the Gera, Nesse, Werra, and Apfelstedt. The south of Gotha and north of Coburg are both mountainous. In the former are the Great Beerberg, 2850 feet high, the Schneekopf, 2829 feet, and the Inselberg, 2655 feet. Both divisions are fertile, the hills are covered with wood, and in Gotha coal and other minerals are found. The climate is mild and healthy, except in the mountainous parts of Gotha, where it assumes a rather inclement character. The chief occupations of the inhabitants, particularly in Coburg, are cattle-rearing and agriculture. The products of the latter are grain, pease, beans, hops, hemp, flax, potatoes—a principal article of food, and some wine. Hogs are fattened in the forests, which also yield timber, pitch, tar, charcoal, and potash. The chief manufactures comprise machinery and machine-fittings, railway-

carriages, fire proof safes, nickel goods, rifles, sewing needles, watches, earthenware and pottery, toys, papier-mache, tobacco-pipes, &c., besides the important textile, button, and paper industries. Breweries, distilleries, tanneries, sawing mills, and linen bleaching establishments are also numerous in the duchy. The principal articles of export are fat cattle, grain, butter, leather, wood, wool, linen, and other manufactured goods. The government, according to the constitution of 3rd May, 1852, is a constitutional monarchy. Each province has its own elective assembly, that of Coburg consisting of eleven, and that of Gotha of nineteen members. Any citizen above thirty years of age who pays direct taxes may be elected a deputy to these assemblies, and every man above twenty five has a vote. The assemblies meet separately every year, and on alternate years they form a conjoint assembly. The united parliament, which meets alternately at Coburg and Gotha, the chief towns of the two provinces, decides questions affecting the whole state, while the separate assemblies settle their own local affairs. The annual revenue and expenditure of the two portions of the duchy are arranged separately for four years. Amongst the institutions for public instruction are a gymnasium at Gotha, another at Coburg, a real gymnasium at Gotha, a progymnasium with real school at Ohrdruf, real schools at Coburg and Gotha, the Salzmann College at Schnepfenthal, a commercial school in Gotha, teachers' seminaries in Gotha and Coburg, also technical schools in these two towns, a deaf and dumb institution in Coburg, and near Gotha an observatory. The ducal house and the greater part of the population profess the Lutheran faith, but there are about 3000 Roman Catholics and 600 Jews. There is entire toleration in religious matters, all sects enjoying equal civil rights. The duchy sends one member to the Bundesrath or Federal Council, and two to the Reichstag or Diet of the Empire. Albert, Prince Consort of Queen Victoria, was the younger brother of the duke, Ernest II, whom Prince Alfred of Great Britain, Duke of Edinburgh, succeeded as sovereign of the duchy in 1893. Prince Alfred died in 1900, being succeeded by Leopold, son of the late Duke of Albany. Pop. in 1895, Coburg, 62,498, Gotha, 154,105, total, 216,603, in 1900, 66,814 and 162,736, total, 229,550.

SAXE-MEININGEN (German, *Sachsen Meiningen*), or **SAXE-MEININGEN-HILDBURGHAUSEN**, a duchy of Central Germany, and one of the minor states of the German Empire, consisting of a main body, and several minor portions isolated from it, and partly situated at a considerable distance, as Kamburg, Kranichfeld, and Lichtenhain. The main body consists of a long and narrow zone of a crescent shape, the concavity turned northwards, and bounded north by Saxe-Weimar, the district of Schmalkalden belonging to Hesse-Cassel, an isolated portion of Prussia, and the principality of Schwarzburg, west by Saxe-Weimar and Bavaria, south by Bavaria and Saxe-Coburg-Gotha, and east by Bavaria, Reuss, and Schwarzburg, greatest length, north west to south east, about 90 miles, greatest breadth, 15 miles, area, including the minor portions, 953 square miles. It is hilly, though scarcely mountainous, the loftiest summits being usually of moderate elevation and covered with forests. On the east the ridges belong to the Frankenstein, on the north to the Thüringerwald, and on the west to the Rhöngebirge. The greater part of the surface belongs to the basin of the Werra, which traverses it first in a west, and then in a N.W. direction. A small portion in the north east sends its waters to the Elbe by means of the Saale, and another small portion in the south-west belongs to the basin of the Rhine,

VOL. XII.

being drained by some small tributaries of the Main. There are several small lakes and some mineral springs. The higher districts, though well wooded, are very bleak, and altogether unfitted for agriculture, the best land is in the valleys of the Werra and Saale. The principal crops are rye, oats, barley, wheat, and potatoes. Hops, tobacco, and even a little wine are grown in the more sheltered localities. The pastures are abundant, and rear considerable numbers of cattle. Sheep rearing was once important, but has greatly fallen off. The minerals include roofing slates, salt, and iron. Game and fish are abundant. The inhabitants are very industrious, and when precluded by the nature of the soil from engaging in agriculture manage to earn a comfortable subsistence by manufactures, chiefly of iron-ware, porcelain, glass, sewing machines, and various ingenious articles in wood and paste board. There is also a small woollen industry, besides tanneries, tobacco and vinegar works, &c. The chief exports, in addition to these articles, are wood, salt, wool, and cattle. For administrative purposes the duchy is subdivided into four circles—Meiningen (the capital), Hildburghausen, Sonneberg, and Saalfeld. The educational institutions include two gymnasia and real-gymnasia, a normal college, technical schools, &c. The government is a hereditary and constitutional monarchy. There is a chamber of twenty-four representatives, four elected by the chief land owners, four by those paying high income taxes, and sixteen by the other electors. The great majority of the inhabitants are Lutherans. The duchy sends one member to the Bundesrath or Federal Council, and two to the Reichstag or Diet. Pop. (1895), 234,005, (1900), 250,683. The line of Saxe-Meiningen was founded by Duke Bernhard, third son of Ernest I. of Saxony, the companion in arms of Gustavus Adolphus of Sweden. Up till 1826 the duchy was only one-third its present size, but on the extinction of the ancient family of Saxe-Gotha the territories of Hildburghausen and Saalfeld were united to it.

SAXE-WEIMAR, or SAXE-WEIMAR-EISENACH (German, *Sachsen Weimar Eisenach*), a grand duchy of Central Germany, one of the states of the German Empire, and consisting of three larger portions, Weimar, Neustadt, and Eisenach, and twelve smaller parcels, as Ilmenau, Bosleben, Zillbach, Seebach, Allstadt, Oldisleben, and Thranitz. Weimar proper is bounded north by Prussian Saxony, west by Prussian Saxony and the principality of Schwarzburg-Rudolstadt, south by this principality, and south east and east by the duchy of Saxe-Altenburg. Neustadt lies to the south east of the former, and though at no great distance is completely separated from it. Eisenach, situated considerably to the west, is bounded north by Prussian Saxony, west by Hesse-Cassel, south by Bavaria, and east by the Duchies of Saxe-Meiningen and Saxe-Coburg-Gotha, area of the whole grand duchy, 1388 square miles. The surface is in some parts mountainous and in others gently undulating, the intervening ridges of the higher grounds forming the sides of wide valleys. It almost wholly belongs to the basins of the Elbe and the Weser, the former draining Weimar by the Saale, which traverses it, and the Elster, Orla, Ilm, and Unstrut, tributaries of the Saale, and the latter draining Eisenach by the Werra, and its tributaries, Suhl, Horsel, Felda, and Ulster. The lakes are individually of small extent, but numerous. The Principality of Weimar is the most fertile part of the grand duchy. Eisenach is the district least adapted for agriculture, but raises considerable quantities of oats and potatoes. In the valley of the Saale much hemp is grown, and in some sheltered spots, particularly in the neighbourhood of

Jena, a few vineyards are seen. The forests are very extensive, and form the principal wealth of the grand duchy. The most valuable stock is sheep, to the fleece of which much attention has been paid. Swine also are very numerous, and game and fish are alike abundant. The minerals include silver and copper, formerly but no longer worked, iron and manganese, still worked to some extent, salt, and potters' clay. Manufactures have made most progress in Eisenach, where woollen, cotton, and linen tissues, ribbons, and carpets, &c., are made. In Weimar and Neustadt manufactures are insignificant. In the former the most important articles appear to be books and maps. The principal exports are timber, dried fruit, wool, and gun. For administrative purposes the grand duchy is divided into five divisions, namely Weimar, Apolda, Eisenach, Dermbach, and Neustadt. Of these Weimar is the largest in area, but Apolda is the most populous. The chief town is Weimar. There is a university of considerable repute at Jena. The government, as fixed by the charter of 1816, slightly modified by the law of 1850, is constitutional. The legislative power is vested in a house of parliament, consisting of one chamber of thirty-three members, five of whom are elected by land owners with an income of 3000 marks or more, five by other electors with a similar income, and twenty-three by the rest of the electorate. Electors must be twenty-one years of age at least, and deputies thirty years. The chamber meets every three years, and grants the budget for three years. As one of the states of the German Empire Saxony-Weimar sends one member to the Bundesrath and three to the Reichstag. Pop. (1895), 339,217, (1900), 362,873. At least nine tenths of the inhabitants are Lutherans. They are distinguished both for industry and intelligence. The reigning family is at the head of the Ernestine or elder line of the princely houses of Saxony, the other branches being those of Saxony-Meiningen, Saxony-Coburg-Gotha, and Saxony-Altenburg, while the younger or Albertine line is represented by the kings of Saxony. The line of Saxony-Weimar was founded in 1640 by Wilhelm, the fifth of the eleven sons of Duke Johann of Weimar, and after a temporary subdivision the territories were united in 1741 on the death of the last duke of Eisenach. Its most celebrated ruler was Karl August, the friend of Goethe and Schiller, and the patron of letters, art, and science. In 1815 the Congress of Vienna awarded him the title of Grand duke, and considerably increased his territories. He died in 1828.

SAXICAVA, a genus of lamelliclbranchiate Molluscs (see MOLLUSCA) included in the family Gastrochænidæ, the members of which possess equivalve, gaping shells, with thin, toothless edges, external ligaments, and long, united syphons or breathing tubes. The foot is finger shaped, and the margins of the mantle are thick in front and united, leaving, however, a small aperture for the protrusion of the foot. Like the somewhat allied *Pholades* the *Saxicava* excavate burrows in rocks by means of their shells, and in these burrows they live, their syphons forming media of communication with the external medium. *Saxicava rugosa* is a familiar species, this form being also represented in Post-Pliocene formations. These animals appear also to be found in a free state, that is, not inclosed in their burrows. Wherever they burrow they appear to select limestone rocks as the fields for their operations, and their holes are not round nor smoothed off at the sides, as is the case with the burrows of the *Pholades*. The burrows of *Saxicava* are not more than 6 inches deep, and in addition to the action of the shell in boring, the latter process may be aided in some measure by the

presence of siliceous or flinty particles contained in the anterior portion of the mantle.

SAXIFRAGE (*Saxifraga*), a genus of plants forming the type of the order Saxifragaceæ. The species of the Saxifrage order are herbs with alternate leaves, calyx of 4 or 5 more or less cohering sepals, petals 5 or 0, stamens 5 to 10, ovary inferior, of 2 carpels, fruit, a 1 or 2 celled capsule. Natives of northern Alpine districts, some extend to a great height, one species reaching an altitude of 16,000 feet on Chimborazo. Some grow on rocks, old walls, in woods, or near streams. They have generally caespitose leaves and glandular stems, and their flowers are white, yellow, or red. *Saxifraga aizoides* adorns the Highland streams with its rich yellow blossoms, and *S. oppositifolia*, with its red flowers, forms a rich covering of the mountain rocks in early summer. *S. granulata*, with white flowers and small clustered tubers, is an ornament of the meadows, pastures, and hedge-banks in the south and middle of Scotland. *S. tridactylites* affects old walls, and dry, barren ground, and is a great traveller, being often found unexpectedly in foreign lands. *S. umbrosa* is the well known London Pride or None so pretty. The Saxifrages possess astringent properties.

SAXO GRAMMATICUS (that is, Saxo the Grammarian, or the Learned), the most celebrated of the old Danish historians, who flourished in the twelfth century. He is supposed to have been a native of Denmark, of which kingdom and its dependencies he compiled an elaborate history down to 1186 under the auspices of Absalom, bishop of Roskilde. This work, which is said to have occupied him twenty years in its composition, has gone through several editions, especially those of Paris, 1514, Basel, 1534, and Sorø, in Denmark, 1644, folio, of these the latter is by far the most perfect. The best edition, however, is that begun by P. E. Müller, and completed by J. M. Velschow (Copenhagen, 1839-58, three vols.). Saxo seems to have chosen as his models the later Roman historians, especially Valerius Maximus, yet in some of his forms of expression and in his mode of representation he is but a chronicler of the middle ages, though he stands at the head of his class. The *Historia Danica*, as the work is called, is divided into sixteen books, the earlier of which are not very critical, but when the writer approaches his own time his history is of great value. Although a cleric he is by no means blind to the faults of his order, and shows himself remarkably free from class prejudice. His style is praised by Erasmus for its elegance. Saxo was a priest in the cathedral of Roskilde, and is said to have been deputed on a mission to Paris in 1161 for the purpose of inducing some of the monks of that capital to visit his native country and assist in reforming the discipline of the religious orders there. He died about 1204.

SAXONS (German, *Sachsen*), a Teutonic race, whose name is derived from the Old German word *Saks* (a knife or short sword). They are first mentioned by Ptolemy, who speaks of them as inhabiting a district south of the Cimbrian Peninsula, bounded by the Eider, the Elbe, and the Drave. In the third century of the Christian era they were a numerous, warlike, and piratical people, whose devastations of the Roman territories on the British and Belgian coasts gave rise to the appointment of a particular officer (*comes litoris Saxonici*) to defend these regions. In the middle of the fifth century two considerable hordes of Saxons, under Hengist and Horsa, laid the foundations of the Saxon kingdoms in Britain. (See ENGLAND and ANGLO-SAXONS.) Those who remained in Germany (called, for the sake of distinction, the Old Saxons), the Westphalians, Eastphalians, and

Engrians, occupied a great extent of country, of vague and varying limits, which bore the general name of Saxony (*Sachsen*). Charlemagne waged a thirty years' war against the Saxons, and Witukind, their national hero, with many of his countrymen, submitted to his arms, and embraced Christianity (See CHARLEMAGNE.) In 845 mention is made of a Duke of Saxony, and in the new Kingdom of Germany the Saxons were the most powerful of the six German nations, namely, the Eastern Franks, Saxons, Frisians, Thuringians, Suabians, and Bavarians. In 919 Henry, duke of Saxony, was elected German king (see HENRY I), and transmitted this dignity to his son, grandson, and great grandson (See OTHO I and OTHO II.) The duchy afterwards passed (1127) to the Bavarian branch of the Guelph family, of which Henry the Lion (which see), celebrated for his contest with the emperor, was a member (1146-95). After several changes, which it is unnecessary to enumerate here, Frederick the Warrior, margrave of Meissen and landgrave of Thuringia, became (1242) duke and elector of Saxony. The union of these three countries rendered the Saxon elector one of the most powerful princes in Germany. After the death of Frederick the Good, son of Frederick the Warrior, Ernest and Albert, sons of the former, divided the family possessions between them (1485), and founded the Ernestine and Albertine Saxon lines, which still exist. The latter received Meissen, or Misnia, and now constitutes the royal Saxon house (See SAXONY, KINGDOM OF.) The former retained the electoral dignity and Thuringia. Ernest succeeded in the electorate by his sons, Frederick the Wise (1486-1525), and John (1525-32). The former is celebrated as the protector of Luther, the promoter of the Reformation, and the founder of the University of Wittenberg. By the Wittenberg capitulation (May 19, 1547) the electoral dignity was transferred to the Albertine line in the person of Maurice (See the articles SAXONY and MAURICE.) The Ernestine house is now divided into the two branches of Weimar and Gotha, the latter of which consists of the three lines of Meiningen, Altenburg, and Coburg. Towards the close of the fifteenth century Germany was divided into circles, and the large tract of country known vaguely by the name of Saxony was formed into the three circles of Upper Saxony, Lower Saxony, and Westphalia. Upper Saxony was bounded by Poland, Silesia, and Lusatia, on the east, and by Franconia and Bohemia on the south. It comprised the Electorates of Saxony and Brandenburg, the Duchy of Pomerania, and a number of small principalities. Lower Saxony had Westphalia and the Rhine to the west, and Schleswig, with the Baltic, to the north, and comprised the Electorate of Hanover, the Duchies of Mecklenburg, Brunswick, and Holstein, the free cities of Hamburg, Bremen, and Lubeck, with several smaller states. By the dissolution of the empire in 1806 the distinction of circles was abolished.

SAXON SWITZERLAND, a name popularly given to a part of the Kingdom of Saxony, south-east of Dresden, on the Elbe, bordering on Bohemia. It consists of a group of mountains of sandstone, with valleys and rivers of the most picturesque character, extending from Liebethal to the Bohemian frontier, about 24 miles long, and equally wide. Some of the rocks are 1800 feet high. It is one of the most charming spots on earth, and, on account of its vicinity to Dresden, so much resorted to for its treasures of art, attracts many visitors in summer. The name is improper, because the region does not resemble Switzerland, even in miniature.

SAXONY, KINGDOM OF (Latin, *Saxonia*, German, *Sachsen*, French, *Saxe*), a kingdom of Central Ger-

many, bounded on the north-west, north, and east by Prussia, south east and south by Bohemia, south-west by Bavaria, and west by Rhenish, Saxe-Weimar, and Saxe-Altenburg, greatest length, north east to south west, 135 miles, greatest breadth, 75 miles, area, 5787 square miles. It is nearly in the shape of a right angled triangle, the longest side of which faces the south east, while the opposite vertex is situated to the north of the town of Leipzig. For administrative purposes it is divided into the five Kreishauptmannschaften, or government districts of Dresden, Leipzig, Zwickau, Bautzen and Chemnitz, subdivided into Amtshauptmannschaften or bailiwicks. Their area and population are exhibited in the following table—

Area and Population of Saxony in 1895 and 1900

Government Districts	Area in sq miles	Pop 1895	Pop 1900
Bautzen,	953	385,080	405,092
Dresden,	1674	1,067,757	1,216,044
Leipzig	1377	945,179	1,059,273
Zwickau,	900	1,389,672	{ 727,453
Chemnitz,	799		
Total,	5793	3,787,688	4,190,758

The surface, though very much broken, may be regarded as an inclined plane, which commences in the south, in the Erzgebirge chain, and slopes towards the north. In the more elevated districts the scenery is wild, and sometimes almost desolate, while on either side of the Elbe, from the Bohemian frontier to Pirna, is a remarkable and exceedingly interesting tract, covered with fantastic sandstone formations, which has received the name of the Saxon Switzerland (See preceding article.) Where the surface begins to lower the ramifications proceeding from the principal range form the sides of beautiful and fertile valleys, which, as they flatten down, widen out into plains well adapted for agriculture, and hence, though in the Oberwiesenthal the Fichtelberg attains the height of more than 3700 feet, the mean height above the sea does not exceed 450 feet. On the Prussian frontiers, where it subsides to its lowest point, the height above the sea is only 250 feet. The loftiest summits are generally composed of granite and gneiss, and so rich in mineral products that the ores (*Erz*) contained in them have given name to the whole chain. To the east, on the right bank of the Elbe, the Erzgebirge is continued by the Riesengebirge, a branch of which, under the name of the Lausitzer-gebirge, or Mountains of Lusatia, covers a considerable portion of the east of Saxony. They nowhere reach the height of 2500 feet, though more than one summit exceeds 2000 feet. They are composed for the most part of granite, basalt, and sandstone.

With the exception of a very small portion of the east, which sends its waters to the Baltic by tributaries of the Oder and Spree, the whole of Saxony belongs to the basin of the Elbe, which, forcing its way in a depression of the chain, where the Erzgebirge is conceived to terminate and the Riesengebirge to begin, enters Saxony, traverses it in a north-westerly direction for about 70 miles, and quits it near Strehla, after having divided the kingdom into two distinct portions, of which that on the left or west bank is by far the larger. On the east bank, accordingly, the Elbe here receives only a number of small torrents and streams scarcely deserving of notice, but on the west bank it has several important tributaries, which take their rise and have a considerable part of their course within the kingdom, but do not join the Elbe till they have left it. Of these tributaries the most important are the Mulde, formed by the junction of two main arms called the Zwickau-Mulde and the Freiberg Mulde, and the Elster, which likewise divides itself near Leipzig into two

arms, one of which unites with the Pleisse and Parthe, while the other takes the name of Luppe. The lakes, particularly in the north and north east, are numerous, but individually insignificant.

The climate in the loftier mountain districts, and what is called the *Vogtland*, is very cold and bleak, but with this exception the climate is milder than that of most countries of Europe under the same latitude. In the valleys of the Elbe and the Mulde, and in the neighbourhood of the town of Leipzig, the air is both gentle and pleasant. The only localities which can be considered unfavourable to health are some marshy tracts on the banks of the Elbe and the Pleisse.

With the exception of the lofty barren tracts already referred to, and others of a kindred nature, though less barren, since they are either covered with forests or mountain pastures, the whole surface of Saxony may be said to be under some kind of culture. Over one half of the surface is under the plough, 27 per cent is covered with wood, and above 16 per cent with gardens and meadows. Not a spot capable of being turned to account is allowed to remain waste. The soil, however, is not in general of great natural fertility, and hence, though some of the lower grounds are very productive, the total yield of grain is scarcely sufficient to supply the wants of the dense population (513 to the square mile). The most important crops cultivated are rye and oats, barley, wheat, and potatoes. The chief subsidiary crops are pulse, rape, turnips, oil seeds, hops, tobacco, flax, teasel, madder, and other dye-plants. All the common orchard fruits, particularly apples, pears, and plums, are very abundant. Considerable attention is paid to the culture of the vine, which occupies considerable tracts on the east bank of the Elbe, between the towns of Meissen and Pillnitz, and is also cultivated with success on the sunny slopes both to the north and the south of Dresden. The grass husbandry also is not neglected. Many artificial meadows have been formed, and heavy crops of the finest artificial grasses—lucerne, sainfoin, clover, and rye grass—are everywhere seen. Much of the fodder is employed on dairy stock, from which large quantities of butter and cheese of excellent quality are obtained. Large numbers of horned cattle are also fattened, and annually exported, to the number of 7000 or 8000 head, to Poland and Galicia. Sheep, for which Saxony was formerly so famous, have been less generally attended to in recent years, though by careful crossing with the merino the quality of the wool has been greatly improved, and commands a high price in the markets of the world. The only other domestic animals deserving of notice are horses and swine, of both of which superior breeds are found. Poultry, particularly geese, are very numerous, the rearing of bees, once a very important branch of industry, has greatly declined, but that of silk-worms is still prosecuted with considerable success, particularly in the vicinity of Leipzig, Dresden, Zittau, &c. The great number of forests in Saxony naturally secures an abundance of game. The fishing in the lakes and rivers is tolerably productive, though scarcely equal to the consumption. Among the species of fish are shads, eels, salmon, carp, pike, and trout. In some of the streams, particularly the White Elster and its tributaries, good pearls are often found.

The minerals of Saxony form, perhaps, the most important source of its wealth, and have long been worked with great success. The metals comprehend silver, copper, lead, tin, iron, cobalt, zinc, bismuth, and arsenic. The fuel necessary for the smelting and refining of these metals also exists in great abundance. Not only are the extensive forests,

covering nearly a fourth-part of the whole surface of the kingdom, made available for this purpose, but numerous seams, both of lignite and coal, are found in various districts, and are worked to a considerable extent. Other minerals of value are alum, copperas, mountain-green, ochre, magnesia, fullers', potters', and porcelain earth. The quarries furnish in abundance granite, syenite, porphyry, basalt, roofing-slate, pavement, sandstone, limestone, and marble, and numerous precious stones, including rubies, sapphires, garnets, topazes, jaspers, agates, and carnelians, are found both in the *Erzgebirge*, and in the districts of Leipzig and Meissen. Mineralogical operations are remarkable not only for the magnificent scale on which they are carried on, but also for the consummate ability displayed.

The manufactures connected with the minerals just referred to, taken in conjunction with the mining operations themselves, give employment to a very large proportion of the inhabitants, but there are several other branches of manufacture distinguished for the ability and success with which they are carried on. The woollen manufacture has long been an important industry, the excellence of its productions being partly due to the fineness of the wool obtained from the improved breed of sheep, but it is said that the greater part of the finer wools of Saxony is now exported in a raw state, and that foreigners possessed of larger capital and superior machinery give the wool-growers better prices than their own manufacturers can afford. The consequence is, that the present woollen manufactures of Saxony, though still extensive, have lost much of their reputation for superior fineness. Saxony used to be famous for its porcelain, the process of making which was invented, or rather re-invented, in the country. The Dresden China became famous over Europe, and many of its finer specimens were thought not unworthy of a place in the most celebrated collections of articles of vertu. The manufacture is now so successfully competed with in other countries, and has in consequence declined so much, that it can scarcely claim to be regarded as one of the great branches of national industry. Cotton spinning and weaving, formerly carried on to little extent, has now become the most important branch of Saxon industry, giving work to upwards of 150 spinning-mills. Other very important tissues are linen, silk, and mixed goods, and in connection with them and the other tissues must be taken the vast number of worsted, flax, and fulling mills which are scattered over the country, and meet the eye at almost every turn. Other manufactures deserving of notice are lace, in which great numbers both of young and aged females find the means of subsistence, hosiery, waxcloth, straw-plait, wooden wares, including furniture, machinery, chemical products, musical instruments, tobacco, chocolate, and chicory, paper, types, and books. The number of persons directly engaged in various industries and trades was in 1900, according to official statistics, 548,353, nearly 184,000 of whom are employed in the textile industries. The trade, both external and internal, created by all these branches of manufacture is necessarily very great, at the great annual fairs of Leipzig at the New Year, Easter (the principal), and Michaelmas alone business to above £10,000,000 is done. The introduction of the railway system has brought Leipzig and Dresden into immediate connection, not only with the other leading towns of Saxony, but with the great trunk lines which now traverse the whole of central Europe. In 1901 there were 1886 miles of railway open for traffic. Since the 1st of January, 1875, the money, weights, and measures systems have been uniform with those of the rest of Germany. See GERMANY.

The government of Saxony was fixed by the constitution granted in 1831, but it has undergone many modifications by laws passed in 1849, 1851, 1860, 1861, 1868, 1874, 1888, 1892, and 1896. It is a limited monarchy, in which the executive power is lodged solely in the crown, and the legislative power jointly in the crown and two chambers—a first and a second. The first chamber is composed of the princes of the royal family who have attained majority, the possessors of eight baronial domains, the burgomasters of the eight principal towns, and the superintendents and deputies of five collegiate institutions, of the University of Leipzig, and of the Roman Catholic chapter of St. Peter, at Bautzen, twelve deputies chosen for life by the larger landed proprietors, and fifteen individuals nominated for life by the king. The second chamber is composed of thirty-seven deputies from the towns and forty-five from the rural communes. The members of both houses are paid for their services the amount (12s per day during the session) being the same for the members of each house. Every third year a certain proportion of the members of the second chamber retires, but in supplying their places the retiring members may again be elected. Justice is administered by three classes of courts, namely courts of primary, secondary, and tertiary resort or instance. The first includes all the inferior courts of the kingdom, the second consists of the four appeal courts which hold their sittings at Dresden, Bautzen, Leipzig, and Zwickau, and have each jurisdiction within the four circles of same name, the third is confined to the supreme court of Dresden, whose jurisdiction includes all kinds of cases, and extends over the whole kingdom. In regard to religion universal toleration is guaranteed, but the only religious body specially recognized by the state is the Lutherans, who numbered, according to the census of December, 1895, 3,611,670, the Roman Catholics numbered 140,285, other Christian sects, 25,597, and Jews, 9902. At the head of the educational establishments of the kingdom is the University of Leipzig. Next to it in order are the seventeen gymnasia, ten real gymnasia, and thirty real schools, nineteen normal and various special schools. For elementary education one school at least is opened in every parish, and all the children between six and fourteen are understood to be in attendance. The ordinary budget for 1900 and 1901 estimated the annual revenue and expenditure at about £4,600,000. There is also an extraordinary budget which provided for an expenditure of £5,640,000, chiefly on public works and railways. The army is an integral part of the army of the German Empire under the supreme command of the emperor. For particulars of military districts, general military organization, terms of service, and all similar matters, refer to the section of the article GERMANY which deals with the army of the empire. After the defeat of Austria by Prussia in 1866, Saxony was compelled to place in the hands of the King of Prussia the supreme military command of her army, the right to garrison the fortress of Königstein, the management of the railway, telegraphic, and postal systems, and the charge of the diplomatic representation of Saxony abroad. As a member of the German Empire Saxony has four votes in the Bundsrath, and sends twenty-three deputies to the Reichstag. The chief towns are Dresden (the capital), Leipzig, Chemnitz, Zwickau, Plauen, Glauchau, and Freiberg.

History—We have already given a sketch of the early history of the country in the article SAXONS, we shall here continue the sketch from the foundation of the Albertine line, which now occupies the

Saxon throne. Maurice was, as already mentioned, in virtue of the capitulation of Wittenberg, invested with the electorate of Saxony by the Emperor Charles V., to whom he had rendered important assistance in the Schmalkaldic war. But the arbitrary political measures and the religious severities which were either instituted or promoted by the emperor, led Maurice to join the Protestants, and by a sudden march on Innsbruck he compelled Charles to agree to the humiliating Treaty of Passau (1552). Maurice died in the following year, and was succeeded by his brother Augustus (1553–86), the first economist of his age, who made important additions to the Saxon territories by purchase and otherwise, established many excellent institutions, and introduced numerous useful changes in the government. He was succeeded by his son Christian I., a weak and indolent prince, who died in 1691, after an uneventful reign of five years, leaving his crown to his son Christian II., a minor, whose inactive reign (1591–1611) is chiefly remarkable for the neglect to enforce the reversionary rights of Saxony to the territories of John William, duke of Jülich, on the death of the latter in 1609, and the consequent loss of a splendid inheritance. Christian's brother and successor, John George I. (1611–56), joined Gustavus Adolphus in the Thirty Years' War, and the combined Swedish and Saxon forces defeated the Imperialists under Tilly at Breitenfeld (1631), and under Wallenstein at Lützen (1632). Misunderstandings between the Elector of Saxony and the Swedish chancellor Oxenstiern threw the former into the hands of the emperor, and by the Treaty of Prague (30th May, 1635) Saxony obtained from Austria a cession of the two Lusatias, besides other advantages. Frederick Augustus I. (1694–1733) embraced the Catholic religion (1697) to obtain the crown of Poland, and ever since that date the reigning family of Saxony has proved faithful to the Roman Catholic Church. But Charles XII. of Sweden conquered Poland and occupied Saxony, subjecting it to heavy impositions, while by the peace with Sweden Saxony obtained no compensation for its losses. Frederick Augustus II. also obtained the Polish crown (as Augustus III.) after a war with France, and took part with Austria in the Seven Years' War. The Peace of 1763 left the country, which had suffered severely during the war, loaded with a debt of 40,000,000 thalers. It now became necessary for the government to renounce its ambitious schemes, and endeavour to lessen the pressure of the public burdens. Frederick Augustus III. (1763–1827) reluctantly took part in the war of 1792 against France, and furnished only his contingent as a member of the empire when war was declared by the imperial diet in 1793. In 1806, 20,000 Saxons were sent to the support of Prussia, but after the battle of Jena a peace was concluded with France, and the elector acceded to the Confederation of the Rhine in 1806, and from this date till 1813 his army fought side by side with the French. Napoleon conferred upon him the title of king, and large additions were made to the Saxon territory in 1807 and 1809. In the war of 1813 Saxony was the scene of the struggle between Napoleon and the allied powers. The battles of Lützen and Bautzen, Dresden and Leipzig, stripped the King of Saxony of his newly-acquired territories, and the king himself was twenty months a prisoner of the allies, his dominions being meanwhile governed by Russian and Prussian authorities. The fate of Saxony was long a subject of discussion at the Congress of Vienna, it was at first proposed to unite it with Prussia, and nothing but the jealousy of Austria seems to have saved it from this fate. Its partition was finally resolved upon

in February, 1815, and the king was compelled to cede more than half of his kingdom to Prussia. This cession included the whole of Lower Lusatia, part of Upper Lusatia, the circle of Wittenberg, and parts of those of Meissen and Leipzig, the greater part of Merseburg, &c.—in all a territory of 8160 square miles, with a population of 875,578, and containing all the salt-works and finest grain districts and forests of the kingdom. King Anthony (1827-36) reformed the entire legislation of the country, and granted a liberal constitution, being urged thereto by a popular outbreak in the autumn of 1831. The constitution was proclaimed 4th September, 1831, and the representatives of the state first assembled 27th January, 1833. Anthony died in 1836, and was succeeded by his nephew Frederick Augustus II., who, though favourable to constitutionalism, was unable to secure the confidence of his subjects. In 1843 violent contests took place, accompanied by riots in several of the principal towns, on the subject of the liberty of the press and the publicity of legal proceedings. The struggle was maintained by the Constitutionalists and their opponents for a long time, and without any important result. On the death of Anthony in 1854 his brother John mounted the throne. He showed himself favourable to constitutionalism, and established courts of justice throughout the kingdom. In the Austro-Prussian war of 1866 Saxony took the part of Austria, and during the struggle Dresden, the capital, was occupied by the Prussian troops. Prussia showed a strong inclination to incorporate the kingdom, but Austria, supported by France, so steadily opposed this arrangement that it was abandoned, and Saxony was admitted into the North German Confederation. In the Franco-German war Saxony took part with the rest of Germany against France.

SAXONY, PRUSSIAN, a province of the Prussian monarchy, of very irregular shape, bounded on the west by Hanover, Brunswick, and Hesse-Cassel, on the south by the Saxon duchies and Kingdom of Saxony, and on the east and north-east by the province of Brandenburg. It has also several isolated districts, and incloses Anhalt-Dessau and Schwarzburg. It consists of the three governments of Magdeburg, Merseburg, and Erfurt, which have a united area of 9738 square miles, and owes its name to its having originally belonged to Saxony, from which the far greater part of it (7911 square miles) was dismembered and given to Prussia by the Congress of Vienna. The capital of the province is Magdeburg. Pop. in 1895, 2,698,549, in 1900, 2,833,224.

SAY, JEAN BAPTISTE, a distinguished political economist, was born at Lyons in 1767. He was destined by his father for a commercial career, and passed a part of his youth in England. On his return to France he obtained a situation in a life insurance company, and about this time seems to have studied deeply the works of Adam Smith and other political economists. During the Revolution he was for some time secretary to Clavière, the minister of finance, and from 1794 to 1800 conducted a journal called the *Décade*. In 1799 he was a member of the tribunate, but being removed by Napoleon, declined subsequent offers of office from him, devoting himself to industrial pursuits, establishing at Auchy, near Hesdin (department Calais), a large spinning mill, which soon gave employment to 500 workers. In 1814 he dedicated the second edition of his *Traité d'Economie politique* to the Emperor Alexander of Russia, who called himself his pupil, and the same year was sent by the French government to England to study the economical condition of that country. In 1819 he was appointed professor of industrial economy at the Conservatoire des Arts et Métiers,

and in 1831 was nominated to the chair of political economy at the Collège de France. He died 15th November, 1832. His chief works are his *Traité d'Economie politique* (fifth edition, three vols 1828), translated into English by C. R. Prinsep, and his *Cours complet d'Economie politique pratique* (six vols 1829). The third edition of his *Catéchisme d'Economie politique* appeared in 1826. One of his most ingenious works is *Le petit Volume contenant quelques Aperçus des Hommes et de la Société* (1817). His statistical treatises, *De l'Angleterre et des Anglais* (1815), and *des Canaux de Navigation dans l'Etat actuel de la France*, are also esteemed.

SBIRRI. In Italy, particularly in the States of the Church, there were formerly certain police officers, with a military organization, who were called by this name. They were abolished in 1809.

SCAB, a skin disease in sheep, analogous to itch in man and mange in horses and dogs, being usually propagated by contagion, although poverty and filth will also produce it. It is essentially owing to the presence of minute acari (see *MITE*), which burrow under the skin, and produce excessive irritation, causing the animal to seek relief by rubbing against any hard object. This friction removes the wool, and the labour of rubbing and the irritation cause the animal to lose flesh, and it thus becomes a miserable object. The sheep begins to rub about twelve days after the attack, and at this time hard pimples will be formed, and the skin feels rough. The pustules are usually broken by rubbing in the course of a few days, and the acrid fluid which escapes dries and forms a scab, if this scab is removed a sore is left which spreads in time over a good part of the body, the wool being of course denuded. The acari are extremely prolific, and readily adhere to trees, hurdles, or other objects, against which the affected sheep may rub themselves, so that the least infection is very soon spread amongst a flock. Various medicines have been recommended by good authorities, among which are the following: Lard or palm oil, 2 lbs., oil of tar, $\frac{1}{2}$ lb., sulphur, 1 lb., the two latter ingredients being first mixed together, the former should be rubbed down with it. Or, common salt, 1 lb., coarse tobacco, 1 lb., boil half an hour in a gallon of water, add 2 drachms of corrosive sublimate, and dilute the mixture till it measures 3 gallons. Apply about a pint of this to each sheep, along the back and over the other diseased parts. Mercurial ointment, mixed with lard (a mixture which must be used with caution), turpentine and oil, and a solution of arsenic and a little sulphur, have also been found effective.

SCABBARD, the case in which a sword or bayonet is worn, and which serves to prevent the weapon from injuring its wearer, while it protects the blade itself from damp, &c. Scabbards are usually made of leather, tipped, mouthed and ringed with metal, or of brass, steel, &c. The scabbards of the British cavalry are made of steel, which is well adapted for standing the friction of the horse's accoutrements. With regard to form and minor details, scabbards, like swords, have naturally varied much from time to time.

SCABBARD FISH, a genus of Teleostean fishes, included in the family Cepolidae or Ribbon fishes, or in the group Trichuridae or Hair-tailed Fishes of some authors. The Scabbard-fishes (*Lepidopus caudatus* and *L. argyreus*) are so named from the resemblance presented by their thin attenuated bodies to the sheath of a sword. The average length is from 3 to 5 feet. The dorsal fin is single, and continuous throughout its entire length. The ventral fins are of rudimentary and scaly nature—hence the *Lepidopus* ('scale-fin'). The body is covered by

a thin, delicate epidermis, of silvery whiteness, but destitute of scales. In April and May these fishes approach the coasts, and are then captured for the sake of their flesh, which is said to be palatable and nutritious. The *L. argyreus* is common at the Cape of Good Hope, and occurs also on the southern English coasts. These fishes belong to the Acanthopteroan division of the Teleostean order.

SCABIOUS (*Scabiosa*), an extensive genus of plants of the natural order Dipsacaceæ, and belonging chiefly to Southern Europe and the countries about the Mediterranean. The stems are herbaceous, and the flowers are united in heads at the extremities of the stems and branches. *S. succisa* is remarkable for having the root suddenly truncated, and as if bitten off, whence the name of *devil's bit* is applied to it. The natural order includes *Dipsacus Fullonum*, Fullers' Teasel, the dried capitula of which are used by fullers for dressing cloth.

SCAD, or HORSE-MACKREL (*Trachurus trachurus*), a genus of Teleostean fishes included in the family Scomberideæ or Mackerels, and found around the coasts of Britain. It appears in large shoals, and the flesh, although coarse, is esteemed and eaten salted during the winter months. The colour is a dusky olive on the back, the sides being variegated by bands of a bluish colour. The belly and sides of the head are of a silvery white colour or lustre, and the lateral line is furnished with a row of strong, keeled plates of bony structure. The body, from the presence of these plates, presents somewhat of a square outline.

SCÆVOLA. See MUCUS.

SCAFELL, or SCAW FELT, a mountain of England, in the south of the county of Cumberland, near the borders of Westmoreland, consists of two principal summits, separated from each other by a deep chasm. Of the two peaks the higher is 3229 feet, the other 3092 feet in height. It has a nucleus of granite, overlain by slate, but its summit is composed of trap-porphry. Borrowdale, famous for its graphite, is immediately east of it.

SCAGLIOLA, a composition made to imitate the veined marbles and other ornamental stones. It consists of finely pulverized calcined gypsum, made into a paste with alum and a thin solution of Flanders glue, and coloured with any of the earthy colours, such as the several ochres, boles, sienna earth, and sometimes chemical colours, such as the chrome yellows, &c. This is spread over the object intended to represent marble, and while the composition is still soft, splinters (Italian, *scagliole*) of spar, marble, granite, alabaster, &c., are pressed into and made level with the surface. When it is set hard the surface is rubbed with pumice stone, and cleaned at the same time with a wet sponge, after which it is finely polished with the ordinary fine polishing materials. Columns are coated in this manner, made of a wooden frame work within, and covered round with laths for receiving a coating of mortar, upon which the scagliola is laid, they are then placed in a lathe to be dressed and polished. The glue is the cause of the fine glossy surface, but makes it apt to be injured by moisture or even damp air, consequently this kind of work is only fit for interior architectural ornaments. In Italy the art is carried to great perfection, and its invention is claimed for Guido del Conte, or Fassi (1584-1649), an ingenious mason of Carr, near Correggio, in Lombardy.

SCALA NOVA (ancient *Neapolis*), a seaport town in Asiatic Turkey, at the head of the gulf of same name, 40 miles south of Smyrna. It is built on a steep and rounded hill which overhangs the sea, and faces north and north west. Though highly picturesque in appearance, its houses are poor and

wretched. Part of the town is inclosed by a strong and massive wall. The ruins of the ancient city of Ephesus are in the neighbourhood. Population of Scala Nova, about 20,000. The Gulf of Scala-Nova, the south side of which is formed by the island Samos, is about 45 miles long, and 20 to 25 miles broad.

SCALARIA, a genus of Gasteropodous Mollusca, including those forms popularly known as 'Wentle traps,' and belonging to the family Turritellidæ, in which the shell is tubular, spiral, and turreted, the aperture simple, the operculum horny and many-whorled, the foot very short, and the branchial plume single. In the Wentletraps the sexes are distinct. The eyes are situated at the bases of awl shaped tentacles. No central teeth exist in the *odontophore*, or ribbon like tongue, the teeth being simply arranged in transverse rows. Most of the species inhabit tropical seas, but several inhabit British waters. The *Scalaria* shell is turreted, and ornamented with elevated rib like processes, crossing the whorls in the long axis, or length of the shell. The *true* Wentletraps possess whorls or turns of the spiral shell distinct from each other. The famous Precious Wentletrap, or Royal Staircase (*Stalaua pectosa*), formerly brought prices ranging as high as £50 when purchased for the conchologist's cabinet, but its value in the present day is of a more modest figure. This animal possesses a large shell twisted in a wide spiral form, and is generally of a pale yellow colour, with white ribs. This species occurs in the Indian and Chinese seas. The *false* Wentletraps have their shell whorls contiguous or united. The Common Wentletrap (*Scalaria communis*) is a familiar shell-fish of British coasts, and possesses a turreted shell averaging about 1½ inch in length. Its colour is usually of a pale drab, with prominent ribs, which are of a purplish colour. The animal itself is of a blackish-gray colour speckled with white, and possesses a proboscideiform mouth, long tentacles, and a foot of triangular shape. This form, like many other familiar Gasteropods, secretes a fluid of a purple colour, which is described (as obtained from *S. clathrus*) as collected from behind the head, and to be affected neither by volatile nor fixed alkalis. Mineral acids turn this colour of a bluish green hue, sulphuric acid turns it bluish, whilst the effect of sunlight, long continued, was to cause it, when laid on paper, to disappear. The Wentletraps are inhabitants of deep waters, but their shells are cast up in great numbers on sandy coasts. They are carnivorous in habits.

SCALDS, or SKALDS, like the rhapsodists of ancient Greece and the bards of the Celtic tribes, were at once the poets and historians of the Scandinavian race, the Icelanders, Danes, Norwegians. They sang the praises of the gods, and celebrated the exploits of the national heroes. The scalds were the companions and chroniclers of the chiefs, whom they accompanied to battle, and at whose court they resided in time of peace. A sacred character was attached to them, and they performed the office of ambassadors between hostile tribes. They were often richly rewarded for their songs, and even married the daughters of princes. A regular succession of the order was perpetuated, and a list of 230 of the most distinguished in the three northern kingdoms, from the reign of Ragnar Lodbrok to that of Valdemar II., is still preserved in the Icelandic language, among whom are several crowned heads and distinguished warriors of the heroic age. Very few of their poems are extant, but numerous fragments are preserved partly in the younger Edda, in the sagas, and in the *Heimskringla*. The songs relating to the northern sacred and heroic traditions, which occur in the older Edda are of a more ancient date.

than the scaldic institution itself, and form the source from which many of the scalds of later times draw a large share of their inspiration.

SCALE, a mathematical instrument, containing several lines, drawn on wood, brass, silver, &c, and variously divided, according to the purposes it is intended to serve, whence it receives various denominations, as the plain scale, diagonal scale, plotting scale, Gunter's scale, &c

SCALE (from the Latin *scala*), the name given at first to the arrangement made by Guido of the six syllables *ut, re, mi, fa, sol, la*, also called *gamut*. The word *scale* is likewise used to signify a series of sounds, rising or falling from any given pitch or tone, to the greatest practicable distance, through such intermediate degrees as are determined by the laws of music. See **MUSIC** and **GREGORIAN TONES**.

SCALES, appendages covering the bodies of various groups of Vertebrate animals, and included in the exoskeleton or hard parts developed in the skin. The fishes exemplify forms in which the development of scales reaches generally a high degree. In Amphibia scales are not usually present. In Reptilia the exoskeleton may vary from scales of horny nature to bony scales or plates termed *scutes*. And lastly, certain mammals may develop scales—the Pangolins (which see) or Scaly Ant eaters, and the Armadillos, with their bony plates, exemplifying such forms.

The scales of the Pangolins are *ectodermic* appendages, that is, are formed by horny deposits taking place in the *epidermis* or outer layer of the skin. Each plate or scale in this case is comparable in the mode of its formation to the nails (which see) of man. The scales of serpents, for example, on the other hand, consist of horny coverings of processes of the *dermis* or under skin, whilst the scales of fishes are formed by the *dermis* itself.

Scales vary greatly in form and structure in the various vertebrate groups. In fishes four kinds of scales are found. The *cycloid* or 'circular' scale is the commonest variety, and is seen in the Salmon, Herring, and most of our familiar fishes. It generally appears in the form of a horny plate, of a more or less circular form. The *ctenoid*, or 'comb like' scale (seen in Perches), is so named from its hinder margin being cut into spine-like processes resembling the teeth of a comb. The *ganoid* scales are so named from their brilliant appearance, and consist each of a layer of bone covered by a hard, shining, enamel substance or *ganoin*. These latter scales, found in a few existing fishes (Sturgeon, Bony Pike, Polypsterus, &c), are more specially characteristic of fossil fishes, and more particularly of those found in the Old Red Sandstone or Devonian formations. The order of fishes named Ganoides derives its name from the presence of these ganoid plates, which also occur in a few Teleostean fishes, such as the Placognathus (Trunk and File Fishes) and the Lophobranchius (Sea-horses). The last variety of scales found in fishes is the *placoid* scale, seen in the Sharks, Skates, Rays, and their allies. The latter consist of bony granules, tubercles, or plates, and frequently possess spines, as seen in the Thornbacks. See **RAY**.

Agassiz proposed to classify fishes into four orders, distinguished by the nature of the scales, but this mode of arrangement, effected by taking as a guide only one part or character in the organization, is never of so true a character as where more than one part, together with the internal structure, is made the feature of the classification.

SCALIGER, JOSEPH JUSTUS, the tenth child of the celebrated scholar noticed below, was born at Agen in France, in 1540. In the eleventh year of his age he was sent to Bordeaux, where he studied the Latin language for several years. The plague obliged him

to return to his father, who required him to compose a Latin discourse daily, by which means he soon became thoroughly acquainted with that language. After the death of his father he went, at the age of nineteen, to Paris, where he devoted himself to the study of Greek. According to the story of Heinsius he shut himself up in his chamber, and committed the whole of Homer to memory in twenty-one days, the remainder of the Greek poets in three months, and all the other Greek writers in the course of two years. He next studied Hebrew, Syriac, Persian, and most of the modern European languages, and exercised himself in poetical compositions in the classical languages, having already, in his sixteenth year, written a tragedy in Latin. He then for some time led an unsettled life of which we have no particular account. His conversion to Protestantism doubtless prevented his advancement in France, but in 1593 he was made professor of polite literature at Leyden, where he died in 1609. He had the character of a scholar, absorbed entirely in his books, and paying little attention to the common affairs of life, so that he never was rich, yet he refused several presents of money, sent him by distinguished men, out of respect to his talents and learning. He was never married. In regard to pride and arrogance he was little inferior to his father, whose tales respecting the origin of his family he endeavoured to confirm. He was also remarkable for his asperity and contemptuous tone towards his adversaries. He boasted that he knew thirteen languages, and he was so entirely immersed in his studies that he would pass whole days in his chamber without eating. Of his numerous works, the treatise *De Emendatione Temporum* (Paris, 1583, Geneva, 1609) is one of the most important. In this learned work he gave the first complete and scientific chronological system, and for these labours, and his discovery of the Julian period, deserves to be called the founder of this science. Many errors which were exposed by Petavius and others he corrected in the *Thesaurus Temporum*, completeus Eusebii Pamphili Chronicon (Amsterdam, 1658). His annotations to Theocritus, Nonnus, Catullus, Tibullus, Propertius, Seneca (tragedies), Varro, Ausonius, Festus, are characterized by an excessive subtlety, and too great freedom in regard to the text of the authors. His *Poemata* have little poetical merit, his *Epistolæ* are more valuable. On the whole, Joseph Scaliger had less genius than his father, but more learning and accuracy.

SCALIGER, JULIUS CÆSAR. The history of this celebrated scholar is involved in some obscurity, through his vanity. According to his own story he was descended from the celebrated house of the Scaligeri (Scalae), princes of Verona, and was born at the castle of Riva, on Lake Garda, became a page of the Emperor Maximilian, whom he served in war and peace for seventeen years, then received a pension from the Duke of Ferrara, studied at Bologna, commanded a squadron under the French viceroy, applied himself to the study of natural law, and in 1525 accompanied the Bishop of Agen to his diocese in France, where he settled. This account found credit with some learned men, among whom was De Thou, the friend and admirer of his son Joseph, but others, even in his own day, as, for instance, Scioppius, ridiculed it, and treated it as wholly or mainly fabulous. According to Tiraboschi Scaliger was the son of Benedetto Bordoni, a Paduan, who carried on the trade of a miniature painter in Venice, and received the name Della Scala either from the sign of his shop or the name of the street he lived in. Scaliger was born in 1484, and resided in Venice or Padua till his forty-second year, occupied with study and

the practice of medicine, and published some works under the name of Giulio Bordoni. Either some promise, or the hope of bettering his condition, induced him to remove to Agen, where he became physician to the bishop of the diocese. In 1528 he appears not to have formed any such design of giving himself out as a descendant of that princely family, for he was then styled, in his act of naturalization, *Julius Cæsar della Scala di Bordon*, doctor of medicine, of Verona in Italy. He must, however, have appeared with some distinction in Agen, as in 1530 he married Andietta de Roques-Lobejac, a young lady of a rich and noble family there. It was from this period that he began to assert his princely descent, without furnishing any proof of the truth of his pretensions. But his name acquired celebrity by his writings, which gave him a high rank among the scholars of his age, although his arrogance made many enemies. The boldness and freedom of some of his works rendered his faith suspected, but he died a good Catholic, October 21, 1558. Scaliger was certainly a man of uncommon abilities, and although he was one of the late learned, yet few men have surpassed him in erudition. He had a powerful memory and an active mind, he thought boldly, if not always logically. Of his physical works we may mention his *Exercitationum exoticarum Liber quintus decimus de Subtilitate ad Cardanum* (Paris, 1557), *Commentaries on the Work of Hippocrates De Insomnis* (1538), and a work upon the treatises of Theophrastus and Aristotle on Plants, and of the latter on Animals, with a translation. As a philologist he wrote two discourses against the Ciceronianus of Erasmus, an excellent work on the Latin language, *De Causis Lingue Latine Libri xvi* (Lyons, 1540, Geneva, 1580), the first philosophical treatise on this subject. His work *De Arte poetica Libri vii* (Lyons, 1561 and 1581) gained him much reputation, but displays more grammatical learning than poetical imagination or critical spirit. Modern critics do not accord him the same praise which Lipsius, Casaubon, Vossius, &c., bestowed on him.

SCALLOP. See PECTEN.

SCALY ANT EATER. See PANGOLIN.

SCAMANDER, a small stream in the Troad, and which was, according to Homer, also called *Xanthus* (yellow) by the gods, rose, we are informed by the great poet, near the city of Ilium, having two sources, one sending forth hot water and the other cold. Strabo says that in his time there were no hot springs in this district, and asserts further that the river had but one source, which rose in Mount Ida, far away from Troy. It flowed west and north-west, and after receiving the little river Simois, about 2 miles from its mouth, discharged itself into the Hellespont, but since the first century of our era the rivers have had separate courses. The Scamander has been identified with the modern Mendere.

SCAMMONY, the inspissated juice of the root of *Convolvulus Scammonia*, which grows wild in Syria and other parts of the Levant. The juice is obtained by making incisions in the upper part of the root, and placing shells or cups to receive the milky fluid which exudes, and is dried in the sun. The purest scammony is procured in this manner, but such is rarely exported. The scammony of commerce is merely the expressed juice of the entire roots, sometimes even mixed with that of the stems and leaves, and evaporated to the consistence of a solid extract. The greater part of the scammony used in Great Britain is imported from Smyrna. Scammony has been known from a very ancient period, it is mentioned by Hippocrates, and many peculiar virtues were attributed to it at that time,

now it is considered only as an active purgative, and as such is still much in use. The root of the plant is thick, fleshy, and tapering, 3 or 4 feet in length by 3 or 4 inches in diameter, it gives out one or several slender climbing stems provided with triangular arrow shaped leaves, the flowers are large, white, or slightly purplish, disposed two or three together. The roots of the British species *Convolvulus (Calystegia) Sepium*, *C. arvensis*, and *C. Soldanella*, possess purgative properties.

The chemical constitution of scammony has not been thoroughly investigated, the quantity of resin extracted by alcohol averages about 78 per cent, besides which it contains wax, albumen, gum, starch, &c. Scammony is often very much adulterated, such substances as gypsum, starch, &c., being used for the purpose.

SCANDALUM MAGNATUM, in English law, denotes a wrong done to high personages of the land, as prelates, dukes, marquesses, earls, barons, and other nobles, and also the chancellor, treasurer, clerk of the privy seal, steward of the house, justice of one bench or other, and other great officers of the realm, by false news or false messages, whereby debates and discord between them and the commons, or any scandal to their persons, might arise. For slanders of this kind, though such as would not be actionable in the case of common persons, redress is provided by many old statutes. Action on this plea is now obsolete.

SCANDERBEG (that is, *Alexander Bey*), prince of Albania, whose proper name was George Castriota, son of John, prince of that country, was born in 1404 or 1414. Being given by his father as a hostage to Sultan Amurath II, he was educated in the Mohammedan religion, and at the age of eighteen was placed at the head of a body of troops with the title of *sanjak*. After the death of his father in 1432 he formed the design of possessing himself of his principality, and having accompanied the Turkish army to Hungary, entered into an agreement with Hunades to desert to the Christians. This design he put into execution, and having ascended the throne of his fathers he renounced the Mohammedan religion. A long warfare followed, but although frequently obliged to retire to the fastnesses of mountains, he always renewed his assaults upon the first favourable occasion, until the sultan proposed terms of peace to him, which were accepted. The Venetians having entered into a war with Mohammed II induced Scanderbeg to renounce his treaty with the sultan. He obtained repeated victories over the Turkish generals, and saved his own capital, although invested by an army commanded by Mohammed himself. He was at length carried off by sickness at Lissa, in the Venetian territories, in 1467. His death was soon followed by the submission of Albania to the Turkish dominion. When the Turks took Lissa they dug up his bones, of which they formed amulets, to transfer his courage to themselves.

SCANDINAVIA, the ancient name of the region now comprehending the three northern kingdoms Denmark, Sweden, and Norway, or Sweden and Norway alone, and still not uncommonly used. The inhabitants were known to the ancient nations of the south of Europe only by vague rumour. Tacitus mentions the *Suones* (Swedes) as a naval people. Pliny notices a peninsula called *Nergon* (Norway, in Swedish, *Norve*, Danish, *Norge*). Many suppose Iceland to be the *Thule* of the classic writers. The name *Danus* is first found in Gregory of Tours, in the sixth century of the Christian era. Sweden, Norway, Denmark, and Jutland were inhabited, in the earliest times, by people of the Teutonic stock. B.C. 100 the natives of Jutland and Schleswig be-

came formidable to the Romans under the name of *Cimbri*. About A.D. 250 commence the fabulous accounts of Odin, Othun, or Woden. Till the middle of the ninth century Scandinavia was little known, but the bold expeditions of the natives into the southern and western parts of Europe, and the diffusion of Christianity among them about the year 1000, shed light on this region. At this period the inhabitants of Scandinavia were divided into hordes, like the Tatars. In the ninth and tenth centuries these tribes enjoyed a golden age of piracy. By the western historians they were spoken of under the title of *Danes* and *Normans* or *Northmen*, the Russians called them *Varangians*. From Sweden, Norway, the Danish Islands, from Jutland and Schleswig, the rude adventurers sailed to near and distant harbours, within and without the Baltic, to England, Scotland, Ireland, Holland, Germany, France, Spain, and Italy, sometimes they only plundered and destroyed, and sometimes founded new states. See NORMANS, also DENMARK, NORWAY, and SWEDEN.

Scandinavian or Old Norse Literature, includes the literature of the people of Norway, Sweden, and Iceland, before their conversion to Christianity. It goes back as far as the earliest history of the North, and comes down to the period when the last traces of heathenism disappeared. It is of great importance both to Germany and England, for, as they were converted to Christianity much sooner than the Scandinavians, they retain no literary monuments of their heathen period. The Old Norse literature has preserved to us not only the old vernacular peculiar to all nations of Teutonic origin, and distinct from that of all the other western nations, but also a mythology which, rude as it is, approaches, in the rich invention which it displays, to the mythology of Greece. (See NORTHERN MYTHOLOGY.) Not only the poetry and mythology, but likewise the history, the antiquities, of which the Runic monuments (see RUNIC ALPHABET) are the principal, and the existing collections of laws, afford rich materials for the knowledge of the pagan period of the northern countries. In the eighth century native authors appeared, who rescued the traditions of the past from oblivion. The Lombard, Paulus Diaconus, is the first of these authors remaining. He belongs to about the end of the eighth century. The days of the week must have been named in very early times, after the Norse gods Tyr, Woden, Thor, and Freya, for in the time of Charlemagne their names had become so well settled that when he gave new names to the months he did not venture to alter the names of the days of the week. Adam of Bremen (who died in 1076), in his book *De Situ Regnorum septentrionalium*, gives an account of the Swedes when they were yet in part heathens, of the temple of the gods at Upsal, and of the gods Thor, Woden, and Frey (whom he calls Frisco). He shows how they are represented, but this is nearly all Saxo Grammaticus, a Dane, was distinguished in the second half of the twelfth century. His sixteen books of the *Historia Danica* are a remarkable phenomenon. Using the language of the Roman classics, and skilled alike in verse and prose, he takes a course peculiar to himself. The novelty of his subjects, the obscurity of his sources, the wonderful character of his stories, the charms of his style, produce a great effect. Samund Frode (died 1133), Are Frode (died about 1148), and Snorri Sturluson (murdered in 1241) are also writers of much merit. Till the invention of the art of printing little was known of the literature of Scandinavia in the rest of Europe. The first important light shed on it was by Arngrim Jonson's discovery of a parchment manuscript of the prose Edda—that is, of the younger Edda, composed by Snorri Sturluson. In September, 1628, Jonson sent

to the celebrated physician Ole Worm (Olaus Wormius) this manuscript, now preserved in the library of the University at Copenhagen, with its appendix, the *Scaldia*. Ten years later another Icelandic, Bryngulf Svenson, discovered a second parchment manuscript of the prose Edda, and also a parchment manuscript of the poetical Edda. (See EDDA.) Both were placed in the royal library at Copenhagen. In the year 1665 Peter Resen, or Resenius, published specimens of the poetical Edda, and the whole prose Edda. The Edda of Resen is a great literary curiosity. A century elapsed before this new and wild mythology produced any considerable excitement in Scandinavia and Germany. Before the time of Resen the lovers of northern antiquities had received from Ole Worm his *Runic Monuments*, in six books (1643), from Stephen Stephanus, a new edition, and full commentary on Saxo Grammaticus (1644), from Olaus Verelius, the *Hervararsaga* (1672), and the *Runographia Scandinavica* (1675). Scheffer's *Upsalia Antiqua* (in 1666, about the time of Resen) afforded interesting views of the doctrines and worship of the north. About the middle of the 18th century Gottfried Schutze, a patriotic German, wrote *Apologies for the Ancient Tribes of Germany and the North*. The first part of the older or poetic Edda was printed by the Magnæan Institute in 1787, with a Latin translation. The result of Græter's researches into the manuscripts containing remains of old northern literature in the library of the university at Halle was a collection called *Northern Flowers* (Leipzig, 1789, by Graff). His Bragur stimulated the learned, particularly of Germany and Denmark, to further investigations. A new spur was given to the study of Scandinavian literature by a *refacimento* of the *Nibelungenlied*, by Hagen, in 1807, presenting the same matter in a German and Christian form which the long expected second part of the poetic Edda was to have given in a northern and heathen form, and by the appearance at length of an Icelandic grammar (1811), and a dictionary by Rask. In 1818 the second part of the older Edda was published, and the third part in 1828. Many works have since been published, connected with Scandinavian literature, which we cannot particularize here. The most important of the productions of Scandinavian literature are Icelandic in their origin, and written in the dialect properly belonging to that island. Of Icelandic literature proper we have already given an outline in the article ICELAND.

SCANNING, in poetry, the measuring of a verse by feet, in order to see whether the quantities be duly observed. The term is chiefly used in regard to Greek and Latin verses. Thus a hexameter verse is scanned by resolving it into six feet, a pentameter by resolving it into five feet, &c.

SCANSORES, the order of Birds represented by Cuckoos (*Cuculidae*), Woodpeckers and Wry-necks (*Picidae*), Parrots (*Psittacidae*), Toucans (*Rhamphastidae*), and Trogons (*Trogonidae*). This group, particularly known as that of the 'climbing' birds, is distinguished primarily by the fact that the toes are directed two forwards and two backwards, this disposition of the digits being that most favourable to the exercise of climbing powers. One of the hinder toes is the hallux or great toe, which is normally directed backwards in almost all birds, the other hinder toe is the outermost of the three toes which in other birds are directed forwards. The feet are generally *scutellate*—that is, provided with shield-like scales, which rarely exhibit a reticulated appearance. The tarsi are never covered with a single long anterior plate in any Scansorial bird. The form of the bill varies much. In some (for example, Parrots) it is much arched and curved, the upper mandible

being hooked and sometimes dentated or toothed at its tip. Such a bill materially aids in climbing, and is well adapted for opening the fruits and for crushing the seeds upon which these birds feed. In others (for example, Woodpeckers) the bill is of straight conformation, and has its extremity pointed or truncated. This latter conformation of the beak indicates an insect dietary. The wings in most Scansorial birds are rather short, and the powers of flight are proportionally feeble in the majority of cases. The nests are constructed in the hollows of trees, whilst some (for example, Cuckoos) have the peculiar habit of depositing their eggs in the nests of other birds, the young when hatched being brought up by the foster parents. In their reproductive habits the Scansorial birds are mostly monogamous, each male mating with but a single female.

The Cuckoos, which are so notorious for depositing eggs in the nests of other birds, have the bill slender and compressed, the tail long and rounded, and the toes long and of unequal size, the nostrils being placed in a membranous groove of the bill. These birds are widely distributed over the globe. The Woodpeckers possess a strong, wedge-shaped bill with lateral ridges, the tongue is markedly extensile, and barbed at its tip—a structure which, together with the viscid saliva, is well adapted for the capture of insect prey. The tail feathers are stiff, and terminate in acute points, and are used to aid these birds in maintaining their position on the stems of trees. The Parrots have an arched and hooked bill, the nostrils opening at the base of the upper mandible in a *cere*. The tongue is of soft and fleshy nature. The Toucans possess very large bills, caused by the hollowing out of the mandibles into air cells. The tongue is long, and notched laterally. The Trogons possess triangular bills. Their feet are weak and short, as also are their wings, the gape being bordered with short bristles. Several of the Scansorial birds are illustrated at the title ORNITHOLOG Y (Pl. I).

SCAPE GOAT, in Jewish antiquities, the goat which was set at liberty on the day of solemn expiation, typically to bear away the sins of the people.

SCAPULA, or SHOULDER BLADE, the bone which in most Mammalia forms the chief bone of the shoulder girdle, and which mainly supports the upper limb on the trunk or axial skeleton. Viewed as a part of the shoulder girdle, and with reference to its homologies throughout the Vertebrate group, the scapula presents many interesting features for consideration. It may facilitate a clear understanding of these relations if the shoulder blade of Man be first described. In Man the scapula exists as a flattened bone of triangular shape, which lies on each side of the body, on the back and towards the upper and outer border of the chest or thorax. The internal surface of the scapula is concave, and is applied against the ribs, and to this surface the name of *subscapular fossa* is given. The outer or dorsal surface is divided into two portions by a strong ridge—the *spine* of the scapula—which runs obliquely across the bone. The portion of the dorsal surface above the ridge is termed the *supraspinous fossa*, whilst that below it receives the name of *infraspinous fossa*. Of its three borders the shortest one is that which is uppermost, whilst its hinder border is the longest, and from its lying nearest the backbone is named the *vertebral border*. The spine of the scapula, arising, as it were, from this latter border of the scapula, begins as a mere ridge, and gradually becomes more pronounced and prominent as it passes obliquely upwards to the shortest border of the bone, where it ends in a large projecting process known as the *acromion process*. This latter is flattened in a

direction opposed to that in which the spine of the scapula itself is compressed. In the upper border of the scapula a deep notch is seen, in front of which a second process, strongly projecting and curved, is seen to rise. This process is named the *coracoid process*, and contributes in part to form a cavity for the articulation of the head of the *humerus*, or bone of the upper arm. The third border of the scapula, that opposed to the vertebral border, is termed the *axillary border* (Latin, *axilla*, the arm pit), from its contiguity to the arm pit. This border ascends in an oblique fashion from the angle (*inferior angle*) formed below by its junction with the vertebral border, to terminate in a cup-shaped cavity known as the *glenoid cavity*, in which the head of the *humerus* rests. This glenoid cavity is rounded, slightly concave, and is overhung by the coracoid process on its internal and front aspects, and by the acromion process on its external and posterior aspects. A scapula is very generally present among vertebrate animals, and that of man agrees with that of nearly all other mammals in its essential structure.

SCAPULARY, part of a monk's dress, consisting of two pieces of cloth, of which one covers the breast, the other the back. With lay-brothers the scapulary only reaches to the knee, with the other religious to the feet.

SCARABÆUS, a genus of beetles, forming the type of the family Scarabæide, included in the Lamellicorn tribe of the Coleoptera. The *S. Ægyptiorum* or *sacer*, or sacred beetle of the Egyptians, is a familiar example. These beetles are sometimes named 'dung beetles' from their habit of inclosing their eggs in pellets of dung, which are placed in holes excavated for their reception. The *Scarabæus Ægyptiorum* is notable on account of the veneration in which it was held by the ancient Egyptians, who wore figures of it carved in stone as an amulet, and also embalmed it.

SCARAMOUCHE (Italian, *scaramuccia*), one of the grotesque characters of the Italian stage, who was dressed entirely in black, wore a mask, and represented the swaggerer and poltroon. In France the scaramouch was used for a greater variety of parts.

SCARBOROUGH, a municipal and parliamentary borough, watering place, and seaport in England, in the county of York (North Riding), beautifully situated on two open sandy bays, separated by a bold promontory of rock 300 feet high, on the North Sea, 39 miles north east of York. Surrounding the respective bays are the North Sands and the South Sands, the North Cliff and the South Cliff, the main part of the town being on the south bay, and rising in successive tiers from the shore in the form of an amphitheatre, with elegant terraces, crescents, and isolated mansions. The new part of the town here is divided from the older by a deep valley or ravine, which is crossed by two bridges. Scarborough has a town hall, market hall, custom house, assembly-rooms, public rooms, and three theatres, Established churches, and places of worship for Roman Catholics and various dissenting bodies, hospitals, a sea-bathing infirmary for poor invalids, some fine hotels (the Grand Hotel contains 1000 rooms, including 300 bed rooms), a fine aquarium, a museum of geology and natural history, a mechanics' institute, &c. Scarborough is much frequented for sea-bathing and for its mineral waters. These last are obtained from springs on the sea shore under a cliff, and the 'Spa' and its grounds are attractive features of the place. The waters contain carbonate and sulphate of lime, magnesia, and oxide of iron, and are esteemed efficacious in stomach complaints. Along the sea front of the south bay has been constructed a substantial sea-wall, forming an agreeable promenade.

There is also a sea promenade and promenade pier on the north bay Scarborough harbour is the only port of any consequence on the east coast between the Humber and Whitby, and is used as a place of shelter from the easterly gales which prevail on this coast, though confined at the entrance it is easy of access, and safe and commodious within. There is a floating dock and a lighthouse. The castle, on the promontory above mentioned, was erected about 1138, and is a most conspicuous object to the seaward. Scarborough carries on a limited foreign trade, principally with France, Holland, and the Baltic, and a moderate coasting trade. Rope and sail cloth making, the manufacture of jet ornaments, and the fisheries give employment to many of the inhabitants. The borough sends one member to Parliament. Pop. of the mun and parl. borough (co extensive) in 1891, 33,776, in 1901, 38,160.

SCARFING, a particular method of uniting two pieces of timber together by the extremities, the end of one being cut or notched so as to fit into the other, making the part where the junction takes place of the same thickness as the rest of the pieces of timber.

SCARIFICATION, in surgery, the operation of making little cuts or punctures in the skin by means of a lancet or the instrument known as the scarificator, by which ten or twelve lancets are made to act on pulling a kind of trigger. The removal of flesh from the root of a tooth in order the better to get hold of it with an instrument is also so called.

SCARLATTI, ALESSANDRO, chapel master at the Neapolitan court, born at Naples, 1650, was educated at Rome under Carissimi, and after residing some time in Germany and at Rome, passed the last years of his life at Naples, where he died in 1725. The Italians called him the pride of art and the first of composers. He composed a great number of motets and about 200 masses.

SCARLET FEVER, an extremely infectious fever, very common among children, and often more dangerous because of its consequences than on account of the actual fever. The symptoms of an ordinary case are that the person complains of shivering, weariness, headache and sickness, and *sore throat*. In children a convulsive fit, instead of shivering, not seldom begins the illness. There is great heat and dryness of the skin, and frequently the dulness and drowsiness of the patient are quite marked. Some amount of delirium is frequently present. There is thirst, but no desire for food. The pulse is very fast. The appearance of the tongue is peculiar. It is thinly coated with a white fur, but is red at the edges and tip, and numerous minute red points are seen standing out, giving an appearance indicated by the phrase—'strawberry tongue,' or 'raspberry tongue.' This is specially seen on the fourth or fifth day of the fever. The sides of the jaws are slightly swollen, stiff, and sore. On the second day of the fever the rash comes out. It comes out in fine red points, so numerous and grouped so closely that the skin appears red all over. Appearing first on the face, sides of the neck, and breast, it is soon spread all over the body. It is most intense by the fourth day, and begins to fade on the fifth, disappearing before the end of the seventh. The intense redness of the skin may be shown by contrast, by drawing the point of the finger firmly over it. A white mark is produced, to which the redness quickly returns. The soreness of the throat may be felt a day or two before the fever—it increases up to the time of the rash appearing—the tonsils being very red and swollen, and in ordinary cases it diminishes when the eruption reaches its height. With the fading of the rash the pulse becomes less quick, the fever lessens, and all the symptoms improve, and in the course of

a few days the fever and its attendant quick pulse, &c., has departed. With the disappearance of the rash another peculiarity of the disease presents itself, namely, desquamation or shedding of the skin. The scarf skin begins to separate in fine or large scales, or in large flakes. It begins on the neck and chest, spreads to the other parts of the body, and to the hands and feet last. This shedding of the skin lasts a considerable time. As a rule it is complete by the sixth week from the beginning of the fever, but it may end much sooner. The chief elements in these symptoms, then, are the sore throat, the scarlet rash, and the shedding of the skin.

While the above statement gives the symptoms and course of an ordinary full developed attack of scarlet fever, there are some varieties. The attack may be mild, exhibiting the main symptoms but in a very slight degree, and often after the first day or two the patient is so little affected that he or she seriously objects to the confinement. It is to this form the term *scarlatina* is applied. It means merely a mild attack of scarlet fever. Practically, however, the mild attacks are often found to be more serious than the severer form just described. *Scarlatina is capable, by infection, of communicating the worst type of the disease, causing rapid death.* Moreover, the evil consequences, so common in the disease, as readily attend the mild as the severe form. In a mild case it is often difficult to impress the patient, or, in the case of a child, its parents or nurse, with a due sense of the risks. Less care is exercised, there is improper exposure, and dropsy or other symptoms of kidney disease speedily appear. *The mildest case of scarlatina ought to be treated with the same watchful care as the most severe.* There are even milder cases of scarlet fever than those noted. A child is feverish and unwell for a day or two, and apparently becomes quite well, though unusually pale and not strong. No rash has appeared, or at least has been noticed. But, in a week or ten days after, the glands at the side of the jaws swell, the ears become sore, perhaps the skin peels, or other symptoms lead to the conclusion that the child has suffered from scarlet fever. Again, there is a malignant form of the disease, in which there are great brain disturbance, convulsions, and low muttering delirium. The tongue is dry, the throat dark red, ulcerated and sloughing. The rash comes out late, and speedily disappears. Death may occur before the rash has time to appear.

The results of scarlet fever are many. Abscesses may form in the throat or in the glands at the sides of the jaw, suppuration may occur in the nostrils and in the eustachian tube leading to the ear. Disease of the ear, accompanied by discharge and ending in deafness, is common. Various affections of the membrane surrounding the heart (the pericardium) and lung may arise. Rheumatism is apt to follow. The chief result is inflammation of the kidneys, attended by dropsy and albumen in the urine. Inflammations of the eyes are not infrequent.

The infection of scarlet fever is undoubtedly at its worst during the shedding of the skin, but not at this period only. It is very probable that the sore throat is also infectious, and that therefore the disease is 'catching' from its commencement to its termination.

Treatment—Disinfection should be practised from the beginning. At the beginning of the disease nothing is more valuable than a warm bath, which the patient should remain in for from 20 minutes to half an hour. Before the bath a double strong eidlitz powder should be given, to children one or two tea spoonfuls of citrate of magnesia or a dose of castor oil. Failing the bath, the person should be wrapped, naked, in a blanket wrung out of warm

water and rolled in warm dry blankets. After an hour or more the wet things may be removed and dry warm clothes put in their place. The patient should be kept strictly to bed in a well-ventilated room, in which a fire is kept burning. If the fever runs high the wet pack with cold water may be repeatedly used if soothing to the patient. For food, milk, beef-tea, strained mutton-broth, switched eggs, and such articles are allowed. To encourage the action of the skin and kidneys the ammonia and ether mixture is valuable. Inhaling the steam of boiling water or sipping warm milk relieves the throat. A warm application over the throat may also be used if the pain is severe. Sometimes nothing is so soothing as allowing a piece of ice to melt in the mouth, and with children giving a tea spoonful of iced milk or water now and again. If the fever runs high, quinine is the best remedy, of which one grain for every two years of age is given, and repeated every six hours as required. For adults the dose is 5 or 10 grains. When the fever has departed, strengthening food is necessary, and iron and quinine tonics. Daily during the progress of the case, including the period of fever, sponging the body with lukewarm water containing some vinegar is very relieving. The whole body need not be done at once, but by two bathings each day. When the skin begins to separate the body should be rubbed all over with carbolic or camphorated oil. This prevents the scales of the skin being scattered through the air, and diminishes the risk of infection. This should be repeated daily till all the skin has separated. The patient should not be permitted to leave his room or mix with others till all the skin has been shed, and then only after proper disinfection. Grave cases, and cases of kidney disease, &c., must always be in the care of a physician.

SCARP, in fortification, the interior slope of the ditch with which the fortification is surrounded, and which faces the country or champaign.

SCARPA, ANTONIO, one of the most celebrated anatomists and surgeons of the eighteenth century, was born in Lombardy about 1746. His work *Anatomice Disquisitiones de Auditu et Olfactu* appeared at Pavia in 1789, previously to which his *Anatomice Observationes de Structura Fenestræ rotundæ Auris* (Modena, 1772) had already attracted the notice of the learned. At the time of the revolution in Italy he was deprived of his professorship in the university on account of his refusing to take the oath required by the Cisalpine Republic. He now published his celebrated work *On Aneurisms* (1804). When Napoleon, after his coronation at Milan as King of Italy, arrived at Pavia (1805), and received the officers of the university, he inquired after Scarpa. He was informed that he had long ceased to be a member of the university, and was told the reason. 'What,' said Napoleon, 'have political opinions to do here? Scarpa is an honour to Pavia and to any dominions. Let him be honourably restored.' Scarpa was the author of several other surgical works besides those already mentioned. He died in Pavia in 1832. Most of his works have been translated into English and French.

SCARPANTO (anc. *Carpathos*), an island of the Mediterranean, 28 miles south-west of Rhodes. It is about 27 miles in length (north to south) and about 6 broad. It is rocky and mountainous, and contains quarries of marble and mines of iron. There are two harbours on the east side of the island, Port Pernis, near the south, and Port Avderno, near the middle, one on the north, Port Skomaco, and one for small vessels, Port Grato, on the south-west. From the ruins of towns found in it the island appears to have been formerly populous. Pop. 5000.

SCARRON, PAUL, a well-known French author, was born at Paris in 1610. His father, a councillor of the parliament and a man of considerable means, remarried after the death of his first wife. Paul did not agree with his step-mother, and his father first banished him from his house, and afterwards tried to induce him to take orders. In 1634 Paul made a voyage to Italy, where he made acquaintance with Poussin. On his return to Paris he lived a life of licentious gaiety. In 1638, from some unknown cause, he became helplessly paralytic and decrepit—an abridgment, as he called himself, of human misery. La Beaumelle, a writer entirely without credit, attributes this misfortune to a carnival freak at Mans, which subjected him to an attack of the popule, and compelled him to stand all night in water. Scarron, though not accustomed to conceal his follies, expressed his own ignorance of the cause. To add to his misfortune his step mother succeeded in depriving him of his share of his father's inheritance. While supporting himself by his pen he now endeavoured to secure a benefice, the duties of which he hoped would be so simple that a belief in God would suffice for fulfilling them, and in 1643 he obtained this modest appointment at Mans. Here he lived contrary to the statutes of discipline, in a canonical house till 1646. He then returned to Paris, and resumed his literary occupations, and from this time his pen became very prolific, and as he succeeded in securing several pensions his means became considerable. He was introduced to the queen by Mme. Hautefort, and offered himself for a pensioner as her majesty's valetudinarian. He was accepted, and acquitted himself of the duties of his office with integrity. Though a satirist of literary beggars, Scarron was himself the most indefatigable beggar of a begging age. His only apology was his physical incapacity and the humour and pleasantry with which he conducted his suits. He did not long retain the royal pension. It is said that Mazarin, who was noted for his economy, having refused an interested dedication, he revenged himself by writing the *Mazarinade*. It is doubtful if this work was his, but it is certain that he was a virulent opponent of Mazarin, and actively promoted the *Fronde* by his writings. After the success of the court party he endeavoured to make his peace with laudatory verses, but was not successful. Fortunately Fouquet became his patron. Being unable to go out into society, he had brilliant reunions in his own house of celebrated men of letters, and especially of literary women. His house was managed by his two sisters, of whom he said the one loved wine and the other men. In 1652 he married out of compassion a young orphan, Françoise D'Aubigné (afterwards known as Mme. Maintenon, and married to Louis XIV.), who had just returned from America with her guardian, Mme. de Neuillant. Under her management his reunions became more brilliant and better conducted. He lived eight years after his marriage, and died in 1660.

Scarron was a poet of little originality, and who wrote much mediocre stuff, but despite the scorn of Boileau and Racine, he was far from being contemptible. He excelled in burlesque, of which in French literature he was the originator, and despite his constant sufferings, his gaiety and humour were irrepressible. Several actions of his life, including his marriage, also proved him to have a noble and generous nature. Of Scarron's works the best is the *Roman Comique*, in which the adventures of a troupe of strolling players (the very one, it has been alleged, to which Molière belonged) are celebrated. His *Virgile travesti*, notwithstanding some good points, is tedious. He also wrote numerous plays, of which the most successful was *Jodelet ou le Maître Valet*;

and he edited a *Gazette Burlesque*, which was frequently intrusted during his illnesses to other hands. There have been many editions of his works, the best being that published at Amsterdam in ten vols 1737, reprinted at Paris, 1786, in seven vols.

SCATTERY ISLAND, an islet in the mouth of the Shannon, 3 miles south west of Kilrush. It contains a fort, three small churches, and an ancient tower.

SCAUP DUCK, or POCHARD. See POCHARD.

SCEPTICISM (Greek, *skeptos*, perception by the senses, reflection, doubt, whence *skeptikos*, inclined to reflection (doubt), *skeptikos*, doubters, applied to the Pyrrhonists and other philosophers who questioned the fundamental conditions of human knowledge) Scepticism in philosophy early acquired the significance of doubt, or disbelief in dogmatic affirmations, whether derived from authority or founded on necessary reason. A difficulty occurs in regard to the differentiation of scepticism similar to that which we noticed in regard to pantheism, in our article on that form of speculation. Not only does scepticism, like pantheism, appear in philosophical systems not designedly formed on it, but it has had designedly assigned to it very different parts in philosophical speculation. With professed sceptics it is the end or ultimate conclusion, as well as the beginning of speculation. Unable to do more than upset popular notions of truth without substituting anything more certain in their place, sceptical philosophy has no object but the abasement of the human understanding. But, besides this absolute and final negation of all possible certainty, there is a conditional scepticism, a provisional doubt which demands proof, but does not deny the possibility of attaining it. A very important place in the method of philosophy is commonly assigned by reasoners of all the different schools to this form of scepticism, and nearly all systems of philosophy have been materially affected by their manner of dealing with it. On no subject incidental to philosophy, therefore, is it of more importance to acquire clear and accurate notions than on scepticism.

From its very nature, as well as from its provisional use in the method of philosophy, scepticism attacks all manner of objects, and assumes every variety of form. Among the objects of attack an early and conspicuous place belongs to the dogmas of religion. These, whether founded on reason or revelation, necessarily contain in their developed form numerous assumptions, of which the proof is intricate and difficult. But doubt is not confined to religion, and if philosophy admits the attacks of scepticism on theology, theology obtains through the same medium ample revenge on philosophy. The systems are numerous, of which the object is to drive men through philosophical scepticism to the implicit reception of religious dogmas.

The functional position assigned to scepticism in philosophy is not seldom distinctively characteristic of the tendencies of the particular system, and indicates not obscurely the *a priori* assumptions, whether of a positive or negative kind, to which the genesis of the system is to be traced. When a politico-philosophical writer, like Mr Buckle, proclaims scepticism as a necessary antecedent of progress, it is obvious that his view of progress consists in sweeping away much that is established on the basis of common opinion, so when a philosopher proclaims a broad doctrine of scepticism, the natural inference is that whatever dogmas of philosophy may ultimately find favour with him he has already condemned the established dogmas. On the other hand, there is a conservative, or purely speculative scepticism, as exemplified in the case of Descartes, which contemplates less the overthrow of established opinions than

their confirmation by a re-trial, and, if necessary, a strengthening of their proofs.

But whether applied aggressively or defensively the instrumental use of scepticism has been very generally contended for on the one hand, and admitted on the other, on a plea which demands particular consideration.

It is alleged that this instrument is necessary to the existence of philosophy. We inquire because we doubt, and the resolution of our inquiries is the sum of our philosophy. This, as has been said, has been very generally admitted even by the advocates of dogmatism, or by those who hold the possibility of attaining to philosophical certainty. The admission has not been without its inconveniences, and its effects can be traced throughout the whole history of philosophy, in the constant recurrence of tortuous and over strained efforts at proof, which produce on the mind only the feelings of distrust and dissatisfaction. It therefore becomes worth while to inquire if too much has not been conceded to this plausible and insidious, but possibly unsound principle.

In point of fact it can be shown that philosophical inquiry does not originate only in doubt, and it can also be shown that even when doubt is actually present the fundamental position claimed for it in the process of investigation cannot be made good.

Two conditions of human knowledge impose upon man the work of philosophical investigation, and would, independently of the existence of speculative doubt, make philosophy a necessary enterprise, to which the highest powers of the human mind would be devoted. These are the imperfect and fragmentary nature of our knowledge, and the fragmentary distribution of that imperfect knowledge among the various individuals of the human race. The limited and imperfect knowledge which we have of things exists in the human mind, along with the conception of a unity, in which all that is imperfect and fragmentary in knowledge shall be harmonized by the addition of unknown truths into a perfect whole. This conception co-existing with imperfect knowledge, and not any speculative doubt as to the veracity of that knowledge, is the primary cause of philosophy. The first question in philosophy is not, Is our knowledge true? but to what does it lead? The question of veracity is only a prejudicial one, which arises in the course of inquiry, and must be disposed of before the inquiry can proceed. Again, the variety in distribution of human knowledge gives a practical scope and direction to philosophy which would, independently of doubt, not only suggest inquiry, but carry it a certain way towards satisfaction.

The origin and the end of philosophy then are equally independent of scepticism, and the position so often assumed that a sceptical turn of mind is the proper distinction of a philosopher, the characteristic mark by which the true pilgrim who has entered on the narrow path of philosophical investigation is known from the common wayfarer in the broad road of unreflecting credulity proves to be a mere gratuitous assumption.

The true relation of scepticism to philosophy being prejudicial, it follows that scepticism can be admitted in philosophical investigation only on constraint, and under necessity. The triumph of the one is the defeat of the other, and the more scepticism the less philosophy. The true spirit of the philosopher then cannot be sceptical. It must be inquiring, and, at least, as ready to admit evidence as doubt. That philosophy has departed from this spirit, and given to doubt exaggerated weight and undue importance, can hardly be questioned by the most undoubting sceptic.

Although scepticism has attacked the fundamen-

tales of philosophy, its origin can be clearly shown to be adventitious, and its pretension to establish a dogmatism of doubt shallow and sophistical. The original grounds of scepticism lie on the very surface of common observation. They are to be found in the variety of human opinions. Scepticism takes occasion from this variety to question the authority of these opinions altogether, but in doing so it advances to a generalization, for which the observation founded on offers no justification, and which, indeed, contradicts the premises on which it proceeds. To take, for example, one of the earliest objects of attack, sense impressions, it is observed that the conceptions derived from these impressions are not certain and invariable, but often misleading. This is the ground of all attacks on the validity of sense impressions, for, however these attacks may be abstracted and subtilized in the process of dialectic, the idea of making them has arisen solely from actual observation of the variableness and misleading nature of sense impressions, and had the testimony of sense been uniform it would, so far as the history of scepticism throws any light on the subject, have remained unquestioned. But how does the sceptic discover that any sense-impression has ever misled? Only by putting his faith in some other sense impression. When a scientific conception of any sense impression supersedes a vulgar one, when, for example, it is understood that the earth moves round the sun, not the sun round the earth, the correction is only the result of a more accurate and close observation of physical phenomena, by means of which irrelevant data are eliminated, and a real fact is substituted for an apparent one. We do not ask how, if there were no reality in the operations of sense and the objects to which they are directed, the process of critical revision could be carried on, but we observe that the correction itself assumes the validity in certain respects of the corrected observation. There must always, between the crudest observation and the nicest scientific correction, be so much in common as to infer the identity of the object to which they are directed, otherwise the one could not be a correction of the other, and when the sceptic accepts the correction as a proof of the uncertainty of sense impressions he acknowledges the substantial and progressive accuracy of sensuous observation, otherwise there is no foundation for his criticism, or if at the hazard of his own understanding he refuses to admit progress, he cannot allege contradiction without admitting identity. If even this last he admits only hypothetically, his hypothesis, framed to impugn the consistency of sense impressions, is held together only by the admission of this consistency either in his own impressions or those of others. The utmost the sceptic can advance then is an unsupported assertion of the absolute inconsistency of sense impressions, the moment he attempts to prove or illustrate his proposition, perhaps even to state it, he admits the consistency of some of these impressions. In like manner when scepticism adduces the inconsistencies of human opinion as a reason for challenging the grounds of human knowledge, it undermines and overthrows its own observation for if human knowledge has no certainty to appeal to the charge of scepticism has no ground to stand on, and the conception of certainty would never have arisen to give it being. That man questions his own conclusions, that he possesses the conception of accuracy, and is not satisfied to accept whatever is presented to his thoughts, is of itself an assuring evidence that his reason is capable of exercising a conscientious liberty, and within certain limits, at least, of forming just and adequate conclusions.

Doubt then cannot be wholly eliminated from

philosophy but its place is probationary, and its origin occasional, and it can never without mischief be generalized beyond the occasions which call it forth. Its erection into a system, or its methodical application on *a priori* grounds, always marks the decline of the philosophic spirit. It may aid in determining the legitimate sphere of doubt in philosophical speculation, briefly to classify the leading forms which it assumes according to the legitimate sources of its origin. It may on this ground be exhaustively divided into two classes, subjective and objective. Objective doubt arises when any portion of the evidence on which we believed a fact, or series of facts, to have been certified is invalidated. The assumed facts may still be true, but the evidence on which we believed them to be so no longer remains intact. We have, therefore, to revise our belief, to ascertain if anything essential in the evidence has given way, and if it cannot be otherwise replaced. When we find this to be the case we reject the belief we formerly held, and look on our supposed fact as a fiction. But unless the rejected assumption is one of a series, all founded on the same evidence, we do not on the objective ground reject anything more than the single belief affected by it. All our other opinions remain untouched. Another doubt may, however, arise out of the first. Our judgment has been found defective in one instance, it may be so in others. This is the subjective doubt. This doubt when further examined also assumes a double form. Taken in itself it does not positively impugn any particular judgment not directly affected by the objective doubt. It only excites a general conception of the possibility of error, but this conception is far from destroying all our confidence in our judgments. Its influence if the detection of error is rare may be very feeble, if frequent it may become very strong, but in either case a strict examination will show that it ought not to affect all our judgments alike, and that if it does this result is of the nature of an unreasoning panic not of a well grounded apprehension of real danger. We may find that the invalidated opinion has been arrived at without due care and examination, and in that case we are not likely to suspect opinions on which we are conscious that we have bestowed a thorough and exhaustive examination. I am not likely to be shaken in my conviction of the truth of a mathematical problem which I have just demonstrated, because I have forgotten the name of the hero of a novel which I read yesterday. Or repeated instances may show me that my judgment in some particular is defective, but I will not therefore suspect it in another matter in which I have never known it to fail. I may find that I do not readily recognize a chance acquaintance in the street, but so far from this causing me to doubt the whole of my faculties, I do not even doubt my eyesight in the case of a familiar friend. From this instance, however, it appears that the subjective doubt admits of a twofold division. In any matter in which the judgment is directly impugned the doubt assumes a positive form. I distrust the faculty which misleads me, but I do so discriminatively, if I find it misleads me only in one class of actions I distrust it then only. My inability to recognize an acquaintance does not make me suspect my accuracy in reading a printed book. When the immediate sources of error are thus discriminated, there remains only the general suspicion, that as I have been mistaken in one thing I may be in others. This suspicion is purely negative. It does not invalidate any positive evidence I have for any particular belief. It does not destroy any preponderance of evidence for the general accuracy of my judgments, and while it may induce me to search dili-

gently into the causes of my errors, it would be mere pusillanimity on the ground of such a suspicion to abandon all my positive opinions

These illustrations, derived from the common exercise of judgment, may serve to indicate the proper use and legitimate scope of doubt in philosophy. There, as in common life, doubt has its origin only in known tendencies to error. Beyond the range of these tendencies it has no positive authority, and any general inference from the existence of such tendencies can only serve as a general caution in the use of reason, not as a ground for overturning its authority.

The direct attacks of scepticism, whether against the observations of sense or the conclusions of reason, always end in paradox, for they cannot be made without admitting the thing assailed. The last resort of scepticism, then, is to assert that, as our observations and reasonings are incapable of being assailed in their fundamental positions, they are equally incapable of being proved, and that therefore a state of uncertainty is all that remains to us. But this last position is as untenable as the others. It depends upon the assumption of a narrow and logical conception of proof. When we prove one thing, says the sceptic, we prove it by another, and when we wish to prove that other thing, we prove it by the first. But the proof which can be put in the form of verbal propositions is one thing, and that which can be presented to the mind is another. We use words to represent things of the reality of which we are already convinced. It is impossible, therefore, to represent this reality in words which are subsequent to it and derived from it. This is commonly represented in the language of philosophy by calling our fundamental positions necessary truths. But this is not an adequate account of our reception of these positions, and is, in fact, a concession to scepticism, of which it makes abundant use. The sceptical account is, that we receive these positions simply because we cannot help it, and that they have no other evidence but our inability to resist them. But if we consult our experience we will find that the mind does not only passively submit to, but actively approves these positions, and that there is no other account to be given of our supposed inability to resist them but their reality. Our minds do actively test all positions submitted to them, and it is a pure assumption, for which no evidence has ever been produced, that they are under any necessity of receiving any position whatsoever on any other ground than that of its legitimate presentation as a real object to our conception. It would, therefore, be more proper to call these elementary positions not necessary, but self-evidencing truths. The full extent of their evidence is indeed to be found only in contemplating the whole range of human knowledge. The fundamental positions on which this knowledge is built are thus found to be both self-evidencing and mutually corroborative. If the inconsistencies of observation and opinion would, if they were capable of being proved to be fundamental, invalidate the intelligence in which they are harboured, the consistencies and harmonies of a continually advancing knowledge must confirm the positions on which it is founded, and all the more that many of these harmonies were unperceived when the fundamental positions of knowledge were first adopted.

Pyrro of Elis (B.C. 340-270) was the founder of the first distinct school of philosophical scepticism. The scepticism of this school was of the most absolute kind. All contradistories are equally probable, appearances are neither false nor true, beauty, justice, and other attributes do not distinguish one thing more than another, and logical forms are without force. An undisturbed condition of mind, arising

from abstinence from judgment, is the only aim of philosophy. Scepticism also made its appearance among the followers of Plato. The founders of what is called the Middle Academy employed it against the dogmatism of the Stoics. The academicians differed from the Pyrrhonists in that they did not make scepticism the end of philosophy. It was the result rather than the aim of their reasoning. Arcesilaus displayed his scepticism in abstinence from judgment, and in disputing on both sides of a question. It is supposed by some that he used it only for disciplining his pupils, and that to the initiated he imparted the doctrines of Plato. He disputed constantly with Zeno, as Carneades did with Chrysippus. Carneades declared absolute knowledge to be impossible, and was the author of the doctrine of probability. (See PROBABILISTS.) Aenesidemus of Cnossus, who flourished in the first century after Christ, appears to have employed scepticism with an ulterior view to the construction of a positive form of philosophy, analogous to that of Heraclitus. He put in writing ten sceptical tropes, which appear to have been traditional among the earlier sceptics. The first assumed that the same objects were differently perceived by different animals, and inferred that there is no reason for preferring one mode of perception to another, the second drew a similar inference from the diversities of observation and judgment resulting from differences of constitution among men, the third averred inconsistencies in the evidence derived from the different senses, the fourth alleged variations in the same sense, resulting from the variableness of our physical and mental states, the fifth adverted to the variations in the appearance of objects according to position and distance, the sixth impugned our perceptions of objects on the ground that they are always complex, and that no object is ever perceived apart from all others, the seventh dealt with the complexity of objects themselves, and affirmed that, as each object is made up of various parts, we do not know whether these parts taken separately or together more truly constitute the object, the eighth extended the objection of relativity to all our knowledge, the ninth adduced the prejudicial effects of novelty or custom on our perceptions, the tenth, the prejudices of association and education. To Agrippa, a successor of Aenesidemus, is ascribed a series of five tropes, used by the later sceptics, which form a somewhat deeper entrenchment of doubt. The first alleged the diversities of human opinion respecting the same object, the second, the inherent imperfection of proof, which demands for its completeness an infinite series of demonstrations, everything adduced to prove another requiring itself to be proved, the third was founded on the relativity of knowledge, the fourth objected to the assumption of dogmas as being unproved, and therefore arbitrary, the fifth impugned the reciprocal method of proof, in which one thing is first proved by another, and then the second is adduced to prove the first. These theses appear themselves to present an instance of circular reasoning, for in insisting on the proof of dogmas it seems to be implied that certitude is to be found exclusively in the forms of logical demonstration, forgetting that our whole reliance on logical forms is derived from our assurance of the truth of first principles. At a later period the tropes were reduced to two: first, the diversity of opinions proves that nothing is certain in itself, second, nothing can be made certain by proof, as that would involve a *regressus in infinitum*. This reasoning reduces scepticism to a dogma, and is less consistent than the conclusions of the school of Pyrrho, by which even the reasons for doubt were admitted to be uncertain. Sextus the Empiric (A.D. 200), a writer from whom much information as

to earlier sceptics is derived, argued against the validity of the notion of causality, in which he appears to have followed *Ænesidemus*. A cause he held to be merely a relative conception existing in the mind alone, since a cause cannot be conceived of apart from that which it causes. *Al-Ghazzali* (1059–1111), who taught at Bagdad and afterwards in Syria, finding Aristotelianism and other forms of Arabian philosophy, adverse to orthodox opinions in religion, inculcated scepticism in philosophy along with an implicit faith in religious dogmas. *Duns Scotus*, the celebrated schoolman, took up a similar position, relying on revelation alone for the proof of theological dogmas, which he held to be incapable of demonstration by reason. Among modern sceptics we can afford only a passing mention to *Montaigne*, *Charron*, *Bayle*, and *D'Alembert*. The first, whether from prudence or conviction, always made reservations in favour of religion. *Glanvill* and *Pascal* made philosophical scepticism an auxiliary to the inculcation of religious belief. The genius of the latter has given a value to his speculations independent of the merits of his system.

Hume is the founder of the form of scepticism which has exercised the widest influence on philosophical opinion in modern times. Taking as his point of departure the empirical system of *Locke*, *Hume* denied the validity of the notion of personal identity. He also found that our conception of causation can be traced only to habit, that its validity is limited to the range of experience, and that we can draw no legitimate inference from it beyond this range. To form any reasonable hypothesis of the being of a God or of a future state, or in any way to transcend our experience, is consequently beyond the legitimate scope of our faculties. The doctrine of causation is that on which the influence of *Hume's* philosophy depends. It has found wide acceptance in the empirical and positive schools of philosophy, and is the foundation of almost all the scepticism which prevails in modern schools of philosophy up to the present day. The influence of *Hume's* system, and the various reactions which it has produced, constitute to a great extent the history of modern philosophy, and for further details of it we must refer to our article *PHILOSOPHY*.

SCEPTRE (from the Greek *skēptron*), originally a staff, the emblem of sovereign power. Some say that it was only a lance without the metal point, to indicate the continuance of supreme power in time of peace, but in some cases it may have originated from the simple staff—with many tribes the emblem of old age and wisdom. The *baton*, the short sceptre, has always remained a sign of distinction, as in the case of the marshals. In the Greek assemblies a person who wished to speak received a sceptre from the herald, and the judges also bore it while in the exercise of their authority. Kings swore by the sceptre. By degrees it became the emblem of power alone. Through the Roman emperors it passed to the western monarchs. The sceptre and ball now form the two most important emblems of royal and imperial power.

SCHADOW, JOHANN GOTTFRIED, an eminent sculptor, born in Berlin in 1764. He early showed a liking for the fine arts, but his father being a poor tailor, with a numerous family, he had at first no hope of being able to follow the leadings of his taste. By chance he fell in with a sculptor who gave him lessons in drawing, and thus he at length succeeded in devoting himself to sculpture. He ran off with his sweetheart to Vienna, and there married her, and then, at the expense of his father-in-law, he went to Italy, where he wrought with unwearied diligence from 1785 to 1787 in the museum of the

Vatican and of the Capitol. In 1788 he obtained the position in Berlin become vacant by the death of the sculptor *Tassaert*. His first great work was the monument erected in the Dorothea Church, Berlin, to the memory of the Count of the Mark, a natural son of *Friedrich Wilhelm II*. This was followed by the colossal statue of *Zeithen* in hussar uniform, the statue of *Frederick the Great* in Stettin, of *Leopold* of Dessau in Berlin, of *Blücher* in Rostock, the *Tauernzien* monument in Breslau, *Luther's* in Wittenberg, &c. The four horse chariot of *Victory*, over the Brandenburg Gate of Berlin, was modelled by *Schadow*, and carried out in copper by *Jury* of Potsdam. *Schadow* executed many busts of his eminent countrymen, and numerous reliefs and statues. In 1788 he was made rector, and in 1822 director, of the Academy of Art in Berlin, a position which he retained till his death, which took place on 28th January, 1850. *Schadow* was one of the first of the modern sculptors who dared to withstand the ideal mannerism of the eighteenth century, opposing to it a powerful representation of character, combined with an elevated style. These characteristics are observable in his earliest portrait statues. His most eminent pupil in this respect is *Rauch*, among his other eminent pupils may be named *Dannecker*, *Tieck*, and *Zauner*. His chief literary works are, *Wittenberg's Denkmäler der Bildnerel, Baukunst, und Malerei, mit historischen und artistischen Erläuterungen* (Monuments of Statuary, Architecture, and Painting in Wittenberg, with Historical and Artistic Illustrations. Wittenberg, 1825), *Polyklet, oder von den Massen des Menschen nach dem Geschlechte und Alter* (Polyklet, or the Dimensions of Mankind according to Sex and Age. Berlin, 1834), *Nationalphysiognomen, oder Beobachtungen über den Unterschied der Gesichtszüge und die äussere Gestaltung des menschlichen Kopfs, in Umrissen bildlich dargestellt* (National Physiognomy, or Observations on the Difference in the Features of the Face and the External Form of the Human Head, represented pictorially in Outline. Berlin, 1835), *Kunstwerke und Kunstansichten* (Art Works and Art Views. Berlin, 1849). Three sons of *Schadow* devoted themselves to art. The eldest, *RUDOLF*, born in 1786, gained some reputation as a sculptor, and died at Rome in 1822, the second, *FRIEDRICH WILHELM*, born 6th September, 1789, became a painter of considerable eminence, and was ennobled in 1843, and the third son, *FELIX*, likewise became a painter, and married a granddaughter of the sculptor *Rauch*.

SCHAFFHAUSEN, the most northerly, and also one of the smallest of the cantons of Switzerland. It is very irregular in shape, and consists of three parts, the main section is almost surrounded by the Grand duchy of Baden, its south frontier is washed by the Rhine, which separates it from the canton of Zurich, with which it communicates by a bridge, a small detached section to the south of this is nearly surrounded by the canton of Zurich, communicating with Baden on the north, and being compassed east and south by a bend of the Rhine, a third detached portion, to the east of the main section, lies, like the first, within the limits of the Duchy of Baden, and is washed on the south by the Rhine, by a bridge across which it communicates with the canton of Thurgau. Total area, 119.7 square miles. The surface is very much broken, being traversed throughout by a series of ridges, which ramify from the Jura. They have their general direction from south-west to north-east, are steep on the west, but on the east slope gradually down by terraces, between which are several long valleys and ravines. The only river is the Rhine, but streams of the purest water circulate over the whole country. The climate

is temperate and generally healthy, especially in the valley of the Rhine. The minerals are not of much economic importance. Iron is found in considerable abundance, the well known seams of the Jura which contain it being continued into this canton. The soil is generally fertile. All the ordinary cereals, together with hemp and flax, are raised in abundance. Fruit also of excellent quality is extensively raised, and a great number of sunny slopes are devoted to the culture of the vine. The wine, both red and white, is of fair quality, and some of it bears a high name. The principal manufactures are aluminium, wagons, iron and steel goods, wool, ropes, and watches. That of linen, at one time very important, has very much declined. The inhabitants are generally Protestants, and well educated. The initiative and obligatory referendum are part of the cantonal constitution. The canton returns two members to the National Council. Pop (1900), 41,523.

SCHAFFHAUSEN, a town of Switzerland, capital of above canton, finely situated on an acclivity surrounded by little hills, on the right bank of the Rhine, here crossed by a long wooden bridge, 24 miles north of Zurich. It is remarkable for the antique architecture of its houses, many of which have fronts and projecting oriel windows decorated with carvings and stucco work, and were once generally covered with fresco paintings, though of these few now remain. The streets, however, are narrow and winding, and the town as a whole is not well built. The principal edifices are the feudal castle of Munot, or Munoth, on a height commanding the town, and still capable of being used for purposes of defence, flanked with towers, said to be of Roman construction, with walls 18 feet thick, and provided with bomb-proof casemates, the parish or St John's church, a vast building with a lofty tower, situated nearly in the centre of the town, the minster or cathedral, founded in 1052, in the form of a cross and in the Romanesque style, with a fine tower of great height, a large and richly toned bell 18 feet in circumference, and twelve curious stone statues, which bear the names of the twelve apostles, Judas included, the town house, built in 1412, and containing some fine wood carving in its council chamber, the Imthurneum, containing theatre, concert rooms &c. the gift of a citizen, the museum, containing the town library of 30,000 volumes, &c. The manufactures are important, water power obtained from the Rhine being utilized in carrying them on, while its situation gives Schaffhausen an important transit trade. It has a college or gymnasium, and several other higher schools. The environs of the town are beautiful, and afford many fine promenades. About 3 miles below it are the celebrated falls which bear its name, and by which the whole volume of water in the Rhine, which is here nearly 300 feet broad, is precipitated over a height of more than 70 feet in three separate cascades, formed by two isolated pillars of rock. Pop (1901), 15,430.

SCHAMYL. See **SHAMYL**.

SCHARNHORST, GERHARD JOHANN DAVID VON, Prussian general, was born on Nov. 12, 1755, at Bordenau, near Neustadt, in Hanover. He was educated at a village school, and afterwards was received into the military school of Count William of Schaumburg Lippe Bückeburg. He subsequently entered the Hanoverian service, and soon distinguished himself by several excellent military works. In 1780 he was appointed lieutenant of artillery, and two years later he became a teacher in the artillery school at Hanover, which had been reorganized according to a plan proposed by him. Promoted to the rank of staff-captain in 1792, he took

part as artilleryman in the campaigns of 1793-95 in Holland and Flanders. His brilliant defence of the fortress of Menin gained him further promotion. The Duke of Brunswick recommended him to the King of Prussia, who appointed him lieutenant colonel. In 1804 he was made colonel and ennobled, in 1807, major general, and in 1813, lieutenant general. He was appointed director of the school for young officers of infantry and cavalry. In the unfortunate battle of Auerstadt he was wounded twice, being shortly afterwards taken prisoner, but he was soon exchanged, and took part in the battle of Eylau. After the Peace of Tilsit he was appointed president of the committee for the reorganization of the army, and here displayed great talents, giving the whole army a totally new constitution and spirit. He was equally practical and scientific. He infused into the army a truly national feeling. When Prussia rose *en masse* in 1813, it was chiefly Scharnhorst who contrived, by means of the corps of volunteers and the *landwehr*, as well as by having previously disciplined many more men than the Peace of Tilsit authorized Prussia to keep in actual service, to arm all persons capable of doing military duty. In the spring of 1813 he was chief of the staff in the army under Blücher in Saxony. In the battle of Lützen his leg was severely wounded, and not allowing himself necessary rest, but setting out too soon for Vienna to gain over the Emperor of Austria to the cause of the allies, he died June 28, 1813, at Prague. His statue (by Rauch) stands in the King's Square in Berlin.

SCHAUMBURG LIPPE, a principality of the German Empire, comprising the western part of the former county of Schaumburg, surrounded by Hanover, Westphalia, and the Prussian parts of Schaumburg, area, 131 square miles. It contains the Schaumburg Wald, an extensive forest. It is drained by a number of small streams, tributaries of the Weser. The soil is fertile, and considerable quantities of rye, wheat, oats, and potatoes are grown. The cattle are numerous. In the Buckeburg there are rich seams of coal. The chief branch of industry is weaving. Schaumburg Lippe is a hereditary principality with a constitution granted in 1868. The diet consists of fifteen members, of whom two are nominated by the prince, one by the nobility, one by the clergy, one by certain professional men, the rest being popularly elected. Schaumburg Lippe sends one member to the Bundesrath and one to the Reichstag. The capital is Bückeburg. Pop (1895), 41,224, nearly all Protestants, (1900), 43,132.

SCHEELE, KARL WILHELM, a celebrated chemist who contributed greatly to the improvement of the science which he cultivated, was born at Stralsund on Dec. 9, 1742, and was apprenticed to an apothecary at Gottenburg. He became his own instructor in chemistry, went to Upsala in 1773, where his abilities introduced him to the notice of Professor Bergmann, and was admitted an associate of the Academy. He subsequently became director of a pharmaceutical establishment at Koping, where he continued till his death, on May 21, 1786. He discovered tartaric acid, chlorine, baryta, oxygen shortly after Priestley, glycerine, and arsenate of copper, called Scheele's green.

SCHEFFER, ARY, an eminent painter, was born at Dort, in Holland, in 1795, and sent at an early age to Paris, to study for the profession of an artist. His first picture, Abel singing a Hymn of Praise, was exhibited in 1812, and at once established his reputation. In 1817 he exhibited the Death of St. Louis, in 1819 the Surrender of Calais to Edward III., and in 1822 Francesca da Rimini. Of extremely versatile talents, Scheffer has traversed a very wide

field in the domain of art, and comprises in his pictures subjects both sacred and secular, historical and imaginative. Of the first of these the most celebrated are Christ blessing Little Children, The Agony in the Garden, and Christ the Comforter. From the writings of Goethe he has produced some admirable works, such as Margaret, Mignon, the King of Thule, and others, from Dante, Beatrice, from Byron, Medora, and from Schiller, Eberhardt. Scheffer's pictures are principally remarkable for the grandeur of conception and depth of feeling which they display, the unmistakable reflex of his own character, at once dignified and loving. He died in Paris on 15th June, 1858.

SCHELDT (Dutch, *Schelde*, French, *Escaut*, Latin, *Scaldus*), one of the most important rivers of Belgium and the Netherlands, issues from a small lake near Beaurevoir, on Mount St Martin, in the French department of the Aisne, flows circuitously north past Cambrai to Condé, where it first becomes navigable, then N W past Tournai in the Belgian province of Hainaut to the frontiers of West Flanders, then N E between these two provinces into that of East Flanders, passing Oudenarde and reaching Ghent. Here receiving the navigable Lys, and being joined by two large canals, which maintain the communication between Bruges, Ghent, and Sas, it turns nearly due east, and maintains that direction till it passes Dendermonde, and reaches the frontiers of the province of Antwerp, after which, during the remainder of its course through Belgium, it flows circuitously north, forming the boundary between the provinces of Antwerp and East Flanders. At the city of Antwerp, owing partly to the influence of the tide, it attains a breadth of about 1600 feet, and a depth of 45 feet, and becoming still wider immediately below, forms a capacious and secure harbour, capable of receiving the largest ships. About 15 miles below Antwerp, shortly after reaching the Dutch frontier, it divides into the East and the West Scheldt. The latter, which is called Hond, and is the main stream, flows west between the mainland of Dutch Flanders on the south and the islands of Beveland and Walcheren on the north, and falls into the North Sea a little below Flushing. The other, called the East Scheldt, winds round the east and north-east sides of the island of Beveland, and then between the north of the same island and the south of the island of Schouwen, forming a broad estuary. Both of these arms are in communication with the Meuse and the Rhine. The whole course of the Scheldt is 211 miles. Its principal affluents are, on the right, the Haine, Dender, and the Rupel, formed by the union of the Senne, Dyle, and Nethe, and on the left the Sensée, Scarpe, and Lys. The mouths of the Scheldt are almost directly opposite the mouth of the Thames, which adds greatly to its naval importance.

SCHELLING, FRIEDRICH WILHELM JOSEPH VON, an eminent German philosopher, was born at Leonberg, in the kingdom of Württemberg, on 27th January, 1775. He studied at Tübingen, and for a short time also at Leipzig, and from thence proceeded to Jena, then the centre point for philosophical studies, under the leadership of Reinhold and Fichte. His own tendencies in this direction were, from the first, mainly guided by the latter, and in 1798 he lectured first as a colleague, and afterwards as successor of Fichte. In 1803 he was appointed professor of philosophy at Würzburg, and in 1806 member of the Academy of Sciences at Munich, of which he subsequently became secretary. He lectured at Erlangen from 1820–26, and in 1827 became a professor at Munich, whence he was called to Berlin in 1841 as a member of the Academy of

Sciences, and lectured for several years in the university of that city on mythology and revelation. He retired some years before his death, which occurred at Ragaz, in Switzerland, August, 1854. His first treatises, *On the Possibility of a Form of Philosophy in General*, and *The I as a Principle of Philosophy*, were given by him to the world when he was scarcely twenty years of age. They contain a spirited reproduction of what Fichte had exhibited in his *Idea of a Theory of Science*, and *Outlines of a Theory of Science*. Of a similar nature were his treatises on the *Elucidation of the Idealism of the Theory of Science*, and *Philosophical Letters on Dogmatism and Criticism*, published shortly afterwards. Under the influence, however, of Spinoza's doctrines, Schelling soon declared Fichte's idealism to be only a one-sided exposition of true philosophy, which requires to be essentially supplemented.

Schelling's philosophy, or system of identity, lays down two distinct views of philosophical reasoning, one belonging to the intellect alone, whose province is ideas and judgments, and the other to the reason or the connecting faculty. The intellect or faculty of ideas distinguishes, separates, and places asunder what originally is united and in itself one. Merely comprehended by the intellect, the universe divides itself into two great regions, negative and positive, which, under their various phases, are denominated respectively Matter and Spirit, Objective and Subjective, Real and Ideal, Being and Thought, and Body and Soul. As regards mere reflective philosophy, the two regions are separated from each other by a wide gulf, and each is governed by its own peculiar laws. And in the same manner as with these two regions is there a separation of the Finite and the Infinite. The Infinite is shown as the Beyond of the Finite, which we cannot comprehend by our understanding, but only by faith or presentiment. But as our Reason is only one, and strives to attain the highest unity, it cannot divest itself of the thought, that there can only be one Supreme Existence, one Absolute, which, embracing everything, contains within itself the uniting power of the two regions separated in our intellect. The antithesis of the two regions is only relative, both are originally and essentially One, and only two different forms of manifestation of the One Infinite. The Infinite or Absolute is the eternal, absolute identity of Nature and Spirit, of the Objective and the Subjective, of the Real and the Ideal, so that these two, called also by Schelling the poles of the Absolute, are not two distinct essences, but only two distinct forms or manifestations of the same Absolute Principle. Nature is the entire Absolute of the Real, but under the form of expansion or intuition. Spirit is the Absolute of the Ideal, but under the form of Thought. Nature is accordingly the objective, unconscious working eternal spirit itself, and Spirit is Nature aroused to a consciousness of herself. The laws of Nature are therefore at the same time the laws of Spirit, and conversely. In accordance with this position the differences and antitheses among things are not essential, but only apparent and relative, for in themselves they are different forms and modifications of the same Absolute. That circumstance by which one thing, determined as such, separates itself infinitely from others, is its untrue side. Just in the same manner does it go astray and expiate, as it were in death, its misdeed, for having fallen away from the Absolute, and endeavoured to form an independent existence for itself. The law of the universe is therefore a double one: the eternal production and development of Absolute Identity into the things of time, and the eternal strivings of the Finite to return and reunite itself with the Abso-

lute Yet this position is not to be admitted in the whole strength of the idea For as the Finite is not in reality opposed to the Infinite, but only a particular form of it, so also it has not really fallen away from the Infinite, but only appears so to us, considered from the stand point of reflection In itself the Infinite is as the One, also as the All, and All in All, the only true and real existence And upon this rests the possibility of knowledge For as man is himself a particular form of the Absolute, so all he can do in order to grasp the Absolute is to examine himself and establish within him the eternal by eliminating the temporal But the eternal is his reason, in which the Infinite is present with him Reason itself, as the source of truth, is accordingly in reality not one's human individual reason, but absolute reason, the Absolute itself, as it permeates human consciousness Moreover, man stands related to the body by natural laws, and unites therewith in himself the two forms of the Absolute, Spirit and Nature, and becomes thus a microcosm, an image of the Highest Existence itself

The philosophy of Schelling is important not only as the immediate antecedent to that of Hegel, but as in itself one of the most ingenious products of German speculation Schelling, who survived Hegel, condemned the system of the latter, and gave his own system a new development after Hegel's death Schelling's system, both in its earlier and later developments, was essentially pantheistic, but its later developments are marked by a strong eclectic tendency, which indicates the dissatisfaction of the speculator with his own results The principle of identity, which he retained throughout, from the multiplicity of aspects it is capable of assuming, formed a link of connection between the most various systems, and afforded the utmost facilities for an eclectic development Thus, Plato (from whom he adopted the world soul) and the Neo Platonists, Mysticism, Giordano Bruno, the Leibnitzian monads, Scholastic Realism, and Revelation all contributed to his final scheme He adopted with regard to Revelation the theory that a Pictorial and a Pauline theology are represented in the Catholic and Protestant churches, that these are both dominated by a Johannine theory, in accordance with which he believed his speculation to be framed His last conceptions of deity, however, appear to approximate most closely to Neo Platonism He called his later speculation, based on Mythology and Revelation, positive philosophy, in contradistinction to his speculation on identity, which he called negative philosophy The object of positive philosophy he defined as being not to prove the existence of God from the idea of God, but from the facts of existence to prove the divinity of the existent He distinguished in God a trinity of three persons proceeding from three divine potencies, which issue from a previous unity of indifference, or necessary but unpremeditated being Man is a person in whom, as a result of liberty, the unity of one of the potencies has been broken

Schelling had numerous followers, and contributed to the formation of several independent systems, as Baader's, Krause's, and Schleiermacher's The following is a list of the principal writings of Schelling, in addition to those already enumerated—Ideas for a Philosophy of Nature (1797), The Soul of the World (1798), First Sketch of a System of the Philosophy of Nature (1799), System of Transcendental Idealism (1800), Exposition of My System of Philosophy, published in the Journal of Speculative Physics, edited by him (1801-3), Bruno, or the Divine and Natural Principle of Things (1802), Critical Journal of Philosophy (in conjunction with Hegel) 1802-3, Lectures on the Method of Academical Study (1803), Philo-

sophy and Religion, a small pamphlet in reply to Eschenmayer (1804), Exposition of the True Relation of the Philosophy of Nature to the Amended Theory of Fichte (1806), and The Divinities of Samothrace (1816) In 1834 he published a preface to H Becker's translation of Victor Cousin's *Fragments Philosophiques*, in which he criticised the Hegelian Philosophy He also criticised Hegel in his *History of Philosophy* Schelling's works have been published in a complete edition, containing a *History of Philosophy* and other previously unpublished works, edited by his son, K F A Schelling, first division, ten vols., second division, four vols., Stuttgart and Augsburg, 1856, seq Aus Schelling's *Leben in Briefen, 1775-1820*, was published at Leipzig in two vols., 1869-70 See Von Hartmann's *Schelling's Philosophisches System* (1897) and Watson's *Schelling's Transcendental Idealism* (1882)

SCHEMNITZ, a mining town of Hungary, 65 miles north by west of Budapest, It was once surrounded by walls, of which, however, only a few traces now remain, and it is very irregularly built It contains a Protestant and three Roman Catholic churches a town house, old castle, now almost in ruins, Parist College, new castle or tower, and an important academy, founded by Maria Theresa in 1760, in which a very complete mining education is given The mines of Schemnitz were long regarded as among the most important in Europe, including gold, silver, lead, copper, iron, arsenic, and sulphur The works have been carried to the depth of 180 fathoms, but the produce has, in recent times, greatly fallen off All the imperial mines are connected with each other, and below them is the magnificent adit of Joseph II, 12 feet high and 10 feet wide, extending to the valley of Gran, 10 miles In the neighbourhood are the celebrated thermal baths of Eisenbach or Vichny Cigars, shoes, and clay-pipes are manufactured in the town Pop (1890), 15,247, (1900), 16,375

SCHENECTADY, a city in the state of New York, on the south bank of the Mohawk, about 17 miles north west of Albany It is regularly laid out in streets and squares The Erie Canal passes through it, and it contains the county buildings, the buildings of Union College, two high schools, Ellis hospital, a free library, a state armoury, &c There are manufactories of machinery, locomotives, electrical appliances, shawls, brooms, and woollen and flour mills Union College was incorporated in 1794 Pop (1890), 19,902

SCHERZO (an Italian word signifying *joke, jest*), in music, generally applied to a passage of a sportive character in musical pieces of some length—for example, in symphonies, quartettes, &c Beethoven has made it a common part of the symphony, and it has taken the place of the minuet

SCHIEVENINGEN, an important fishing town and watering place of the Netherlands, in the province of South Holland, 2 miles north west of the Hague It has a Reformed and a Roman Catholic church, a town school, and several other schools, an elegant bathing establishment, and in the vicinity a royal pavilion in the Tuscan style, built in 1826 by King William I It has also boat building yards, a rope walk, smitheries, and sail lofts, but the great staple of the place is the fishing trade Schieveningen is much resorted to for sea bathing It is now incorporated in the commune of the Hague

SCHIAVONE, ANDREA, an eminent painter of the Venetian school, whose true name was Medola, his surname (the Slavonian) being derived from his birthplace He was born at Sebenico, in Dalmatia, in 1522 His parents, who were in humble circumstances, placed him with a house painter at Venice,

where at his leisure hours he studied the works of Parmegiano, Giorgione, and Titian. The latter took him under his care, and soon after employed him in the library of St. Mark, where he is said to have painted three entire ceilings. He was accounted one of the finest colourists of the Venetian school. Two of his compositions are in the church of the Padri Testini at Rimini, representing the Nativity and the Assumption of the Virgin. His Perseus and Andromeda, and the Apostles at the Sepulchre, are in the royal collection at Windsor. He died at Venice in 1582.

SCHICHT, JOHN GOTTFRIED, one of the most scientific musicians and composers of sacred music, was born in 1753, near Zittau, in Saxony, and was the son of a poor weaver. In 1776 he went to the University of Leipzig to study law, but soon devoted himself entirely to music. In 1810 he was appointed to superintend the music in the two chief churches at Leipzig. He studied the theory of music with great zeal and success, and composed several beautiful pieces. Among his numerous works is his universal hymn-book, which contains 1285 melodies, including 306 of his own publication, by Hartel, at Leipzig. Several of his compositions are celebrated. He died in 1823.

SCHIEDAM, a town of the Netherlands, in the province of South Holland, near the right bank of the Maas, 4 miles west of Rotterdam. It was once fortified, but now has only one of its four gates remaining, is intersected by numerous canals, and though irregularly built has broad streets and many good looking houses. Its chief edifices and institutions are two Reformed and several other churches, a handsome exchange, a town house, an elegant concert hall, Latin, drawing, commercial, and other schools, a public library, and various hospitals. The staple manufacture is gin or Hollands, usually bearing its own name, and employing 170 distilleries in the town and district. The other manufactures are linen, linen yarn, and thread, copper and iron castings, white-lead and litharge, cordage, and vinegar. Beside the export of gin there is a considerable trade in grain and coals. Pop (1900), 26,716.

SCHILLER, JOHANN FRIEDRICH CHRISTOPH VON, was born November 10, 1759, at Marbach, a town of Wurtemberg, on the Neckar. His father, originally a surgeon in the army, was afterwards a captain, and finally superintendent of a nursery of trees attached to a castle of the Duke of Wurtemberg. His parents were pious and upright, and if his early education did not afford much opportunity for the development of his genius by intercourse with men of talents or by a wide field of observation it was eminently calculated to awaken that sensibility to the good and the true which formed so essential a trait in his character, and his early acquaintance with the Bible making him familiar with the poetical passages of the Old Testament contributed to develop his poetical genius. The visions of Ezekiel early excited a great interest in him. When a child he always manifested an affectionate disposition, and was devotedly attached to his parents and his sister. He loved at a very early period to repeat the sermon which he had heard at church on Sunday. He would stand on a chair and preach with great zeal, never omitting the divisions which the minister had made in his discourse. His charitable disposition manifested itself early, and never left him. For a long time he wished to study theology, although a brilliant tragedy which he had seen performed on the stage at Stuttgart when he was nine years old strongly attracted his attention towards the drama. His first poem is said to have been written the day before his confirmation in 1772. He had till this time received instruction

at a good Latin school in order to prepare him for the university, but at this time Charles, duke of Wurtemberg, projected the establishment of a school on a military-monastic plan, where no effort should be spared to give the pupils the best education procurable. The duke offered to take young Schiller as one of the pupils. His father could not well refuse such an offer, and in 1773 Schiller was received into the Charles School, at the Solitude, near Leonberg. He studied jurisprudence at this institution, in which the pupils were kept so entirely separate from the world that they were permitted to see no females except their mothers or very young sisters, who visited them on Sundays. Thus the influences under which Schiller's talents were developed were precisely opposite to those which operated on Goethe. The plan of the school was afterwards extended, and medicine allowed to be studied in it, and the school itself was transferred to Stuttgart. Schiller now seized on the opportunity offered, and in 1775 began to study medicine and Latin zealously. His teachers did not all consider him as possessing uncommon talents, but the duke used to say, 'Let that boy alone, he will come to something.' When sixteen years old he published a translation of part of Virgil's *Æneid* in hexameters in a Suabian periodical, but poetry was a forbidden fruit for him and his companions, and attracted them therefore the more. Some poetical books found their way by stealth into the school—the works of Klopstock, Gerstenberg, Goethe, and Lessing. In 1773 Schiller began an epic, the hero of which was Moses, but he destroyed it at a later period. Shakspeare kindled in him a passion for the drama. He undertook two dramatic compositions, which he afterwards burned. Only some passages of one were retained in the Robbers. For two years he studied medicine very ardently, and wrote a Latin treatise On the Philosophy of Physiology, which was never printed. In 1777, at the age of eighteen years, he began to write his Robbers (*Die Räuber*)—a composition with many striking faults, but which, nevertheless, awakens a powerful interest. Schiller himself says of it that 'he dared to describe men long before he knew anything of them within his grated cell,' but, notwithstanding this, it contains some deep views and admirable displays of character. In 1780, when he had finished his studies, he wrote a treatise entitled *Essay on the Connection of the Animal and Intellectual Nature of Man*, printed in 1821 in the *Monatschrift* of Berlin. In the same year he was appointed physician to a regiment in Stuttgart. Whilst in the school he had been able to compose only by stealth, and had often reported himself sick in order to have the use of the lamp in the sick-room while writing his Robbers, not being allowed a light in his own room. Now he enjoyed for the first time some degree of liberty. His Robbers was printed at his own expense, as he could not find any publisher who would take the risk, and in 1781 he was requested to change the play in certain particulars so as to adapt it for the stage. In January, 1782, it was performed at Mannheim, Schiller having willingly made changes wherever he could be convinced that they were improvements. Not being able to obtain leave of absence to go out of the limits of the state he left his regiment without permission, saw his piece performed, and returned with the deepest conviction of the unfitness of his present situation for his talents, particularly as the duke had asked him, after the publication of the Robbers, to show him all his poetical productions, and upon his refusal had prohibited him from publishing anything more except medical works. Having made a second visit to Mannheim to witness the performance of his piece he was on this occasion discovered, and put under arrest. During his

detention he formed the plan of his *Cabale und Liebe* and conceived the idea of his *Conspiracy of Fiesco*. He was now convinced that he must leave Stuttgart unless he should choose to sacrifice his poetry, the charm of his life, but how could he quit the army when he had so long enjoyed an education at the public expense? It was not probable that the duke would allow him to go. He had thoughts of deserting, but the feeling of gratitude towards the duke, and the fear that his father, who, with his family, altogether depended upon the duke, would be made to suffer on his account, caused a great struggle in his mind. At last the impossibility of living without poetry made him resolve to quit his situation. In 1782 he went under an assumed name to Franconia, where he was received by the mother of some gentlemen who had studied with him. He lived in great solitude in a somewhat wild country, in a village called Baumbach, in order to remain concealed and secure against the possible persecutions of the duke. In this situation he finished his *Fiesco* and *Cabale und Liebe*. In 1783 he went to Mannheim, and conceived the idea of *Don Carlos* and *Maria Stuart*. During this period he also composed the *Battle, the Infanticide*, and poems to Laura. In Darmstadt he won the favour of the prince by reading to him some scenes from *Don Carlos*. In 1785 he went to Leipzig, towards autumn to Dresden, where intercourse with men of talents, the charming scenery, the beautiful gallery, and the library detained him until 1787. Here he became acquainted with the father of the poet Körner. This gentleman afterwards wrote a biographical sketch of Schiller. During this period he studied all the works which he could procure relating to the history of Philip II to prepare himself for his *Don Carlos*, and these studies led to his *History of the Revolt of the United Netherlands—Geschichte des Abfalls der Vereinigten Niederlande* (Leipzig, 1788, vol. 1). His *History of the Most Remarkable Revolutions and Conspiracies*, of which only one volume was published, was also produced at this period. *Don Carlos* first appeared at Leipzig, 1787. He himself has written the best and severest critique on this piece in his *Letters on Don Carlos*. The (*Geisterseer—Geisterseher*) (Leipzig, 1789)—was probably caused by the talks respecting Cagliostro. In 1787 Schiller went to Weimar, where Wieland and Herder received him in a friendly manner. In 1788 he met Goethe after the return of the latter from Italy. He had seen him but once before, in his boyhood, when Goethe, accompanied by the Duke of Wurtemberg, visited the academy where he was studying. He did not like him at first partly through his influence, however, he received in 1789 a professorship of philosophy at Jena. Schiller entered on his office with the discourse, *What is universal history, and for what is it studied?* He now devoted himself to history, and the few poetical productions which he wrote at this period are mostly of a historical character, though the *Gods of Greece* was composed at this time, and he also then formed the idea of an epic poem the hero of which was to be Frederick the Great. He paid much attention to philosophy, particularly Kant's, and many of his philosophical and æsthetical treatises date from this period. He lectured on history, and began to publish *Historical Memoirs from the Twelfth Century to the Most Recent Times* (1790), and his *History of the Thirty Years' War* (*Geschichte des Dreissigjährigen Kriegs*), which appeared first in the *Pocket Almanac for Ladies* from 1790-93. In 1790 he married. The French Republic at the beginning of the revolution conferred on him the rights of citizenship, and the Emperor of Germany ennobled him in 1802. Incessant study, protracted far into the night, and the use of stimulants,

undermined his health. The periodical *Thalia* having ceased in 1793, he formed the plan of publishing, with the co-operation of the first writers of Germany, a new periodical, *Die Horen* (The Hours or Hours). He became more intimately acquainted with Goethe, returned with renewed ardour to poetry, and produced, particularly after 1795, the finest lyrical poems which appeared in the *Horen* and in his *Almanac of the Muses* (first number in 1796). In 1797 he produced his first ballads. In 1795 he conceived the plan of a play to be called the *Knights of Malta*, but all his other projects gave way to *Wallenstein* (completed in 1799). *Wallenstein's Camp* is a striking introduction to the parts which constitute the proper tragedy. From 1799 he lived in Weimar, where in 1800 and 1801 *Maria Stuart* and the *Maid of Orleans* (*Die Jungfrau von Orleans*) were produced. In 1803 appeared the *Bride of Messina*, and his last dramatic work, *William Tell*, in our opinion much the best of his tragedies. Death prevented the completion of his *Pseudo Demetrius*. He also adapted Shakspeare's *Machbeth*, *Gozzi's Turandot*, Racine's *Phædra*, &c., for the stage, with which his dramatic works close. After attending a representation of his own *Tell* at Berlin, where he was received with much honour, he died at Weimar, May 9, 1805, only forty-six years old, mourned by all Germany. A complete historico-critical edition of the works of Schiller was published by R. Godeke (1867-76, seventeen vols.) His correspondence with Goethe (two vols., 4th ed., 1881), and that with William von Humboldt (2nd ed., 1876), is of great interest. His correspondence with Körner and others has also been published. Fritz Jonas edited seven volumes of his letters in 1892-96, and his *Geschäftsbriefe* were edited by Godeke in 1875. There is a biography by Madame von Wolzogen, his sister in law (1830), but the standard life is that of Minor (1890 onwards). There are *Lives* in English by Carlyle, Bulwer-Lytton, &c. Some at least of Schiller's works have been translated into almost all European languages. There is an English translation in Bohn's *Standard Library*. The *Robbers* has been translated by Lord Woodhouselee (London, 1792), *Cabal and Love* by Matthew G. Lewis (London, 1797), *Fiesco* and *Don Carlos* by numerous translators, *Wallenstein* by Coleridge (London, 1800), *Mary Stuart* and *William Tell*, and other dramatic works, have also had numerous translators. We may also mention translations of poems and ballads by Bulwer-Lytton (1844), *Minor Poems* by J. H. Merivale (1844), and other translations by Bowring and Lord Lytton.

SCHINKEL, KARL FRIDRICH, architect, was born at Neuruppin, Brandenburg, 13th March, 1781. He was educated at the gymnasium of his native town, and after 1795, when his mother removed to Berlin, in the gymnasium (conducted in that city by Gedike). He became a pupil of Professor Gilly, and on the death of the latter in 1798 succeeded to his private practice as an architect. At the same time he continued his studies, and in 1803 he went with this object to Italy, returning in 1805 by way of France to Berlin. The period of the war being unfavourable for architecture he took to landscape painting, and from 1808 to 1814 painted a series of celebrated dioramas for Gropius. On the return of the royal family to Berlin some of his designs for alterations in the palace were, with the approval of the queen, adopted and carried out. In 1811 he was admitted to the Academy, and in 1820 he became a professor at the Academy. He was the architect of numerous public buildings in Berlin and the provinces. In 1839 he was appointed chief director of public buildings in Berlin. He died 9th October, 1841. A collection of his architectural designs was

published in twenty six parts, Berlin, 1820-37, and his *Werke der Höhern Baukunst*, Potsdam, 1845-46

SCHISM, a separation happening through diversity of opinions among people of the same religion. The longest papal schism was the Great Schism, which began in 1378, when Urban VI and Clement VII both claimed the papacy. It ended with the abdication of the Anti pope Clement VIII in 1429. See **POPE**.

SCHIST, a crystalline rock of more or less distinctly foliated structure, derived from plutonic or sedimentary rocks by metamorphic action. Gneiss is a rock of this kind, having the same constituents as granite (felspar, mica, quartz), but arranged in more or less closely parallel layers, each mainly of one mineral. Other schistose rocks in the great schistose region of the Highlands are mica schist, hornblende schist, chlorite schist, albite schist.

SCHLANGENBAD, a watering place of Prussia, in Hesse-Nassau, 6 miles W N W of Wiesbaden, in a delightful though retired situation, almost buried among wooded hills. It consists chiefly of a group of lodging-houses, and two enormous buildings, somewhat resembling cotton mills, and forming the bathing establishment. The water has a temperature of from 80° to 88°, and though not very remarkable for its medicinal properties, is said to be an admirable cosmetic, purifying, softening, and whitening the skin. It not only attracts numerous visitors, including many persons of the first distinction in Germany and Russia, but is largely exported. The place takes its name, meaning 'Serpents Bath,' from the great number of snakes, said to be harmless, abounding in the neighbourhood. Pop 500.

SCHLEGEL, **AUGUST WILHELM VON**, a distinguished German writer, brother of the no less celebrated Karl Wilhelm Friedrich von Schlegel. Their father, Johann Adolf, was a poet and pulpit orator, and the author of several valuable works. August Wilhelm was born at Hanover, September 8, 1767. He early manifested a great ability for learning languages, as well as much poetical talent. When eighteen years old he recited at the lyceum of Hanover a piece in hexameters on the birth day of the king, in which he gave a sketch of the history of German poetry, which was justly admired. He first studied theology at Göttingen, but soon quitted it for philology. At Göttingen he gained the friendship of Bürger, who, in the preface to the second edition of his poems (1789), consecrated him to the service of the muses, and prophesied his immortality in one of the finest German sonnets. A. W. Schlegel contributed to Bürger's Academy of Belles Lettres. In 1787, when in the philological seminary under Heyne, a Latin treatise by him on the geography of Homer obtained a prize. After leaving Göttingen he acted as tutor for three years in the house of a banker in Amsterdam. He returned to Germany, and took part in the Horen, and Schiller's Almanac of the Muses, in which his translations from Dante, with commentaries, attracted particular attention. Until 1799 he was one of the most active contributors to the General Literary Gazette. In 1797 he began his translation of Shakspeare, of which nine volumes appeared. Tieck undertook their revision. The new edition, completed in 1843, is in twelve volumes. No translation of the great English dramatist is so perfect as this, which may well be called a German reproduction of the original. It has made Shakspeare a German popular poet to all intents and purposes, on the stage and in the closet. Schlegel had become in 1797 professor of Humaniora at Jena, where he delivered lectures on aesthetics, and from 1798 to 1800 was connected with his brother in the publication of the *Athenæum*, a critical journal, which did much to

promote a more independent spirit in German literature. The first edition of his poems appeared in 1800, and Schlegel became the second father of the German sonnet. In 1800 he also published his poetic attack on Kotzebue. In 1801 appeared his *Characteristics and Critiques*, in two volumes, in 1802 the Almanac of the Muses, published by him and Tieck together, which is pervaded by a mystic symbolical spirit. Having separated from his wife he went in 1802 to Berlin, where he delivered lectures, published in vol. II of *Europa*. His *Ion* appeared in 1803. He took an active part in the publication of the *Paper for the Fashionable World*, which was opposed by Kotzebue's *Freimutige* (Liberal), and a paper war begun, not very honourable to the latter. (See *KOTZEBUE*, *AUGUST FRIEDRICH FERDINAND*.) In 1803 appeared vol. I of the *Spanish Theatre*, containing three pieces of Calderon, vol. II followed in 1809. These translations fully satisfied the high expectations which the public had formed from his translation of Shakspeare. In 1804 he published his *Notes* of Italian, Spanish, and Portuguese Poetry. In 1805 he travelled with Madame de Staël, and lived with her at Copet, and in Italy, France, Vienna, and Stockholm. In his elegy on Rome he celebrates his generous friend. He wrote many critiques during this time, partly in the *Jena Literary Gazette*, partly in the *Heidelberg Annals*. In 1807 he published at Paris his *Comparison of the Phædræ of Euripides with that of Racine*, which was written in French, and attracted much attention from the French literati. In 1808 he delivered lectures on the dramatic art in Vienna, and published them at a later period in three vols. (2d edition, 1817). They have been translated into almost all the languages of Europe. In 1812 he made a new collection of his poems (2d edition, 1820). In 1813 he became a political writer in French and German, accompanied the then Crown prince of Sweden as secretary, and received several orders, and the rank of nobility. After the fall of Napoleon he returned to Madame de Staël, after whose death in 1818 he accepted a professorship in the University of Bonn, which had been but a short time established. His marriage with the daughter of Paulus in 1819 was dissolved in 1820. He lectured chiefly upon the history of the fine arts and sciences in ancient and modern times, and after 1820 published the *Indian Library*, a periodical for promoting the study of the oriental languages, particularly Sanskrit. He superintended the printing of the great Sanskrit work *Kūmyāna*, at the printing-office established by him at the expense of the Prussian government. In 1823 he published the *Bhagavad Gītā*, an episode of the epic *Mahābhārata*, with a Latin translation. His oriental studies led him again to France, and in 1823 to England, where he examined the manuscripts at London, Oxford, Cambridge, and Haileybury. In 1827 he delivered lectures at Berlin on the theory and history of the plastic arts, these were followed in 1828 by *Critical Writings*, and in 1832 by *Reflections on the Study of the Asiatic Languages* (in French). In the *Bibliotheca Italiana* he wrote (in 1816) a very learned treatise in Italian, on the bronze horses at Venice, which he declared to be Greek, another treatise (in 1817) in the *Bibliothèque Universelle*, at Geneva, on the group of Niobe, and in the *Zeitgenossen* a life of Necker, remarks on the Provençal language and literature in French (1818), a historical notice of John of Fiesole, and many other pieces. Shortly before his death, which took place at Bonn, 12th May, 1845, appeared his *Essais littéraires et historiques*.

SCHLEGEL, **KARL WILHELM FRIEDRICH VON**, brother of the foregoing, was born at Hanover,

10th March, 1772 He was intended by his father for a merchant, but was liberally educated, to leave him more freedom of choice. He became dissatisfied with the mercantile life during his apprenticeship at Leipzig, and his father withdrew him from his situation there. He was now sixteen years old, and devoted himself to philology with the greatest zeal, one year in Göttingen, and the rest in Leipzig, and could say when he had ended his academic course that there was no Greek or Latin author of importance whom he had not read at least once. About 1793 he first appeared as an author. He contributed to several periodicals of reputation, and in 1797 produced his *Greeks and Romans*, in 1798 his *Poetry of the Greeks and Romans* (two vols.), a sort of continuation of the first. In Berlin he undertook in connection with Schleiermacher the translation of Plato, but soon abandoned the project. In 1799 appeared the first volume of his *Lucinda*, which remained unfinished, and is reproached by many as an idealization of voluptuousness. In 1800 he settled as privatdocent at Jena, and appeared for the first time as a poet, publishing his productions in various periodicals. In 1802 appeared his tragedy of *Alarcos*, and in this year he lived some time in Dresden, and then delivered lectures on philosophy in Paris, where he also published the monthly periodical *Europa*, and occupied himself with the fine arts, and with the Romance languages, studying also the Sanskrit language and literature. The fruits of his Indian studies appeared in 1808 in his treatise on the Language and Wisdom of the Indians (*Ueber die Sprache und Weisheit der Indier*). He now returned to Germany, went over with his wife to the Catholic faith at Cologne in 1803, and in 1808 repaired to Vienna. In 1809 he received an appointment at the headquarters of the Archduke Charles, where he drew up several powerful proclamations. When peace was concluded he again delivered two series of lectures in Vienna, on modern history and on ancient and modern literature. They were published in 1811 and 1815 respectively. His limited views in regard to religion, after his adoption of Catholicism, appear particularly in his modern history. In 1812 he published the *German Museum*, and gained the confidence of Prince Metternich by various diplomatic papers, in consequence of which he was appointed Austrian counsellor of legation at the Diet in Frankfurt. In 1818 he returned to Vienna where he lived as secretary of the court and counsellor of legation, and published a *View of the Present Political Relations*, and his complete works. In 1820 he undertook a periodical, called *Concordia*, intended to unite the various opinions on church and state, but he did not continue it long. Among his latest writings are the *Philosophy of Life* (1828) and the *Philosophy of History* (1829). He also published at a much earlier period the *Writings of Novalis* (see HARTENBERG), in conjunction with his friend Tieck. In 1807 he published a German translation of Corinne, before the French original appeared. He died August 9, 1829. After his death appeared *Philosophical Lectures*, especially on the *Philosophy of Language* (1830). An edition of his works in fifteen volumes was published in 1846. His wife, a daughter of Moses Mendelssohn, and a clever but eccentric woman, was the author of some of the works published under Schlegel's name, such as the incomplete romance of Florentin (1801), the collection of Romantic Poems of the Middle Ages (1804), and *Lothar and Maller* (1805). The two brothers Schlegel always lived on the best terms, however great the difference of their views on some points. The influence which they have exercised, particularly August Wilhelm, on literature in general, and especially in promoting a

more correct understanding of the literature of the middle ages, is very great, and extends far beyond the confines of their native country. They will be remembered in the history of literature as two minds of uncommon vigour.

SCHLEIER, August, philologist, was born at Meiningen, 19th February, 1821, was educated at the Gymnasium of Koburg, and from 1840 devoted himself to the study of theology and oriental languages, first at Leipzig and afterwards at Tübingen. In 1843 he renounced the profession of theology, and went to Bonn, where, under the influence of Ritschl, he took up the study of the classical languages, together with Sanskrit and Arabic. In 1846 he took the degree of Doctor of Philosophy, and soon after qualified himself as a teacher of philology, to which he ever after devoted himself. He made it his especial business to acquire as many and as diversely constructed languages as possible, so as to have a complete view of all the different forms assumed. In 1850 he was called to Prague as extraordinary professor of philology, a chair which he soon exchanged for that of comparative philology. At Prague he made himself more fully acquainted with the Slavonic languages, to a complete mastery of which he afterwards especially devoted himself. With the aid of the Vienna Academy he undertook a several months' journey to Lithuania, in order to learn the Lithuanian language. In 1857 he accepted the appointment of honorary professor of the science of language and Old German philology in the University of Jena, where he continued to labour till his death. His published works embrace a wide range. In 1848 he published at Bonn a work on the comparative history of languages (*Zur vergleichenden Sprachengeschichte*, Bonn, 1848), and another containing a systematic review of the European languages (*Die Sprachen Europas*, 1850). In Prague he published a work on the Church Slavonic (*Die Formenlehre der kirchenslawonischen Sprache, erklärend und vergleichend dargestellt*, 1853), *Handbuch der litauischen Sprache* (two vols. grammar and reading book, 1856 and 1857). In 1859 he published at St Petersburg *Zur Morphologie der Sprache*. He also edited the poems of Christian Donalaitis (*St. Petersburg, 1865*). *Die deutsche Sprache* (1860), and the *Compendium der vergleichenden Grammatik der indogermanischen Sprachen* (*Compendium of the Comparative Grammar of the Indo German Languages*, 1862), are works of recognized merit, the latter in particular, of which a fourth edition was published in 1876, having much influence on the progress of linguistic science. In 1863 he published at Weimar *Die Darwin'sche Theorie und die Sprachwissenschaft*, and in 1865 *Ueber die Bedeutung der Sprache für die Naturgeschichte des Menschen* (*On the Importance of Language for the Natural History of Man*). Numerous minor works appeared in the publications of learned societies. He co-operated with Kuhn in a work on the *Comparative Study of Languages* (*Beiträge zur vergleichenden Sprachforschung*), published in 1858. He died 6th December, 1868.

SCHLEIERMACHER, FRIEDRICH ERNST DANIEL, one of the most distinguished German theologians and philosophers, was born at Breslau in 1768, and received his education at the academy of the Moravian Brethren at Niesky. In 1787 he ceased to be a member of this society, left their seminary at Barby, where he had begun the study of theology, and went to Halle to continue it. In 1794, after having been employed as a teacher, he was ordained a clergyman, and appointed assistant preacher at Landsberg on the Warthe. From 1796 to 1802 he was minister in the *Charité-Haus* (a great hospital) at Berlin. During this period he translated Fawcett's

Sermons (two vols.), contributed to the *Athenæum* conducted by the two Schlegels, and wrote the *Discourses on Religion*, and the *Monologues*, and *Letters of a Minister* out of Berlin. In 1802 he published his first collection of sermons, which was afterwards followed by two others. In 1802 he removed to Stolpe, where he wrote his *Critical View of Ethics*. In 1804 he was appointed extraordinary professor of theology at Halle, and preached to the university. In 1807, when Halle was separated from Prussia, he went to Berlin, and lectured there, as well as preached, with the greatest boldness, on the existing state of things, although a hostile force under Davout occupied the city. In 1809 he was appointed preacher at the Trinity Church in Berlin, and married. In 1810, when the new university was opened in that city, he was appointed ordinary professor, as he had been at Halle during the last part of his residence there. In 1811 he was elected a member of the Academy of Sciences, and in 1814 secretary of the philosophical class, when he was released from the duties which he had discharged in the department of public instruction in the ministry of the interior. In 1817 he became a member of the Academy of Sciences, for which he wrote numerous papers on Greek philosophy and other subjects. In the same year he became president of a synod assembled at Berlin for the promotion of union between the Lutheran and Reformed Churches, which he advocated on a basis of doctrinal liberty. His advocacy of this principle, which was contrary to the ministerial scheme, procured him the disfavour of the government. His death took place at Berlin, February 12, 1834. Schleiermacher was, according to Zeller, the greatest theologian of the Protestant Church since the time of the Reformation, but his fame rests chiefly on his philosophical labours, particularly his translation of Plato, which occupied many years of his life. He was also eminent as a Platonic critic, in which department he has been followed by many distinguished scholars, and has greatly influenced the opinion of his country in regard to the Platonic philosophy. His theological views were entirely based on philosophical reasoning, and were somewhat vague and speculative. He held religion to be based on feeling, and was opposed to insistence on dogmatic forms. Philosophical and theological views of God are, according to him, derived by different methods, and are not dependent on each other, each having its own validity, with which the other does not interfere. His *Life of Christ* is in important respects an anticipation of Strauss's *Schleiermacher's* philosophical studies from 1786-96 were chiefly directed to Kant. He subsequently studied Fichte, Schelling, Hegel, and Spinoza, as well as the ancient philosophers, among whom he was particularly attracted by Plato. Schleiermacher did not develop a complete logical system of philosophy. His views were delivered chiefly in the form of modifications of the Kantian and other systems. Space and time, as well as the categories of Kant, Schleiermacher held to be forms of things themselves, and not merely the subjective forms of our apprehension of them. He recognized with Kant the element of spontaneity in thought, but he held the unity of conception to be a true objective unity, not an empirical creation of the mind. Thus he held the various processes of nature and mind in the world to constitute a unity of manifold existences, not invented by the mind, but having a real existence. All positive affirmations with reference to the Deity he held to be figurative and anthropomorphic. He amended Kant's conception of ethics by making the duty of the individual vary with his individuality. The highest good

he defined as the supreme union of the real and the ideal. The leading works of Schleiermacher are *Ueber die Religion* (1799), *Predigten* (four collections—1801, 1808, 1814, 1820), *Grundlinien einer Kritik der bisherigen Sittenlehre* (1803), *Platon's Werke übersetzt und mit Einleitungen und Anmerkungen versehen* (1804-28), *Der christliche Glaube nach den Grundsätzen der evangelischen Kirche* (1821-22, revised edition, 1830-31). After his death were published, by various editors, *Entwurf eines Systems der Sittenlehre* (1835), *Grundriss der philos. Ethik* (1841), *Dialektik* (1839), *Ästhetik* (1842), *Die Lehre vom Staat* (1845), *Erziehungslehre* (1849), *Psychologie* (1864). His works have been published in three series—*Theology*, *Sermons*, and *Miscellaneous and Philosophical Writings* (Berlin, 1835-64).

SCHLESTADT. See SCHIFFSTADT.

SCHLESWIG (Danish, *Slesvig*), a town and seaport of Prussia, in the province of Schleswig Holstein, at the head of the Schlei, here crossed by a bridge 69 miles N N W of Hamburg. It is irregularly built of brick, but is a neat clean town, strongly resembling some of those in Holland. It is divided into three portions—the Altstadt or Old Town, the Lollfuss, and the Friedrichsberg. The first is the north portion, and is connected with a small holm or islet, mostly occupied by fishers, the second is in the centre, and the third lies immediately below, in connection with a small suburb called Bustorf. The market place, the only public square, is in the Altstadt, the principal street, exceeding 2 miles in length, is in the Lollfuss. The principal edifices are three churches, one of them a cathedral of the twelfth century, a fine Gothic pile, with an altar screen beautifully carved in wood, the old castle of Gottorp, on a little island at the north end of Friedrichsberg, the residence of the stadtholder of the duchy (an office now vacant), and the seat of the Schleswig Holstein government, the lunatic asylum, the deaf and dumb institution, and several benevolent establishments, of which the most important bears the name of the Gray Cloister. Immediately north of the town is the convent of St. Johannis, for noble females, and a little south are the remains of a famous wall called Dannevirke, erected by the pagan kings of Denmark to protect the duchy from the incursions of the northern Jutlanders. The harbour is very shallow, admitting only small vessels, and neither trade nor manufactures are of any importance. Schleswig is the oldest town in Schleswig, dating from the ninth century. For nearly six centuries it was a large, handsome, and important commercial city. In the twelfth and thirteenth centuries it was repeatedly pillaged and devastated, and in the middle of the fourteenth century it suffered much both from hostile violence and fire. Its greatest disaster was the silting up of the mouth of the Schlei in the beginning of the fifteenth century. This, in connection with some other circumstances, particularly the rivalry of the Holsteners, deprived it of its commercial prosperity, and has gradually reduced it to comparative insignificance. Pop (1895), 17,255.

SCHLESWIG HOLSTEIN, a province of Prussia, bounded on the north by Denmark, east by the Baltic, Lubeck, and Mecklenburg, south by Mecklenburg and the territory of Hamburg, south-west by Hanover, from which it is separated by the Elbe, and west by the North Sea, area, 7337 square miles. Schleswig-Holstein forms part of the same peninsula with Jutland, to which in its general character it bears considerable resemblance. Schleswig is separated from Holstein by the river Eider and the Schleswig Holstein Canal. It has a central ridge stretching north to south, a continuation of the central ridge of Jutland, which forms an extensive moorland in the

centre of the country. The west coast consists of sandy flats, with a long line of shoals and quicksands. The east coast is scooped out into fine natural harbours, the soil is fertile, and the scenery diversified and beautiful. The general slope of the country is to the west, to which all the streams of importance flow. Lakes are numerous, the two most important being the Witten see and the Gotteslogs see. Except on the east side the country is poorly wooded, and the chief supply of fuel is drawn from the bogs. Holstein has the same heathy central plain, but considerable tracts of it have been reclaimed and made arable. The west coast is marshy, and, not being protected like the west coast of Schleswig by chains of islands, is exposed from its flatness to the inroads of the sea, from which it has to be protected by lofty dykes. The east coast in its general aspect resembles that of Schleswig. The peak of Bungsberg, in the north east, the highest point of Holstein, is 500 feet in height. Besides the Elbe and the Eider, which skirt its frontiers, the principal rivers of Holstein are the Trave and the Stör, which rise in the central plateau, the former flowing east and the latter west. The principal lakes are Plön and Seedorf, both in the north east. The island of Helgoland is included in the province of Schleswig-Holstein. The country is fertile, and is chiefly agricultural, much attention being also paid to the rearing of stock. Oats, rye, barley, wheat, and potatoes are the chief crops. About two thirds of the inhabitants of Schleswig are Danish, the remainder, and nearly all the Holsteiners, are of German origin. The principal towns are Altona, Kiel, Flensburg, and Schleswig, the capital. Schleswig-Holstein, which became a united duchy in 1386, was appropriated by Prussia after the war of 1866. By the Treaty of Prague North Schleswig was to be allowed to choose between Prussia and Denmark, but the option has not yet been given. For previous history see DENMARK and PRUSSIA. Pop. (1895), 1,286,416, (1900), 1,387,595.

SCHLETTSTADT, a town of Germany, in the province of Alsace Lorraine, on the left bank of the Ill, 26 miles south west of Strasbourg, on the railway to Basel. Formerly it had walls flanked with bastions, and also other works by Vauban. The principal edifices are the parish church of St George, a Gothic structure of the fourteenth century, the church of St Poy or St Fides built in 1094 on the model of that of the Holy Sepulchre at Jerusalem, adjoining this church a large convent, now converted into officers' barracks, a fine Gothic gateway surmounted by a large square turreted tower, a gymnasium, seminary for women teachers, public library, &c. The manufactures consist of metallic gauze, leather, bricks, &c. Schlettstadt is an old German town which belonged to France from 1631, but was taken by the Germans in 170. Pop. (1895), 9301.

SCHLIEHMANN, **HEINRICH**, celebrated for his excavations in Troy and Greece, was born at Neu Buckow (Mecklenburg-Schwerin) on Jan. 6, 1822. After studying in the real school of Neu Strelitz he spent five years as a pupil in a retail business in Fürstenberg. Leaving this place, he went to Hamburg and embarked as cabin boy on board a ship bound for Venezuela. The ship was wrecked on the coast of Texel, but Schliemann was saved and taken to Amsterdam. Here he became a message boy in a commercial house and set himself to acquire a thorough knowledge of the chief European languages. In 1846 he was sent to St Petersburg as agent of another Amsterdam house. By 1856 he had learned modern Greek and begun the study of ancient Greek, and in 1858-59 he travelled in Sweden, Denmark, Germany, Italy, Egypt, Syria,

and Greece. Having amassed a considerable fortune in trade, he retired from it entirely in 1863 in order to devote himself wholly to archaeological studies. He travelled round the world in 1864-66, and in 1868 went to the coast of Asia Minor by way of Corfu and the Morea. Between 1870 and 1882 he and his wife directed excavations of the site of Troy, and were rewarded with archaeological treasures of great value. Even more valuable in its results was his excavation of the site of Mycenæ in 1876, and among subsequent sites excavated by him were those of Orchomenos (1881-82) and Tiryns (1884-85). The objects brought to light in his first excavation he presented to the German nation, and they are now in the ethnological museum in Berlin. He died at Naples on Dec. 26, 1890, and is buried at Athens. He described his travels and excavations in various works, among which are the following: *Trojanische Altertümer* (1874), *Mykenæ* (1878), *Ilios* (1881), *Orchomenos* (1881), *Troja* (1884), *Tiryns* (1886), &c. Posthumous works are *Bericht über die Ausgrabungen in Troja*, 1890 (1891), and *Selbstbiographie* (1891).

SCHLOSSER, **FRIEDRICH CHRISTOPH**, a celebrated German historian, was born at Jever, in the Duchy of Oldenburg, 17th November, 1776. He attended the gymnasium in Jever, and in 1794 went to the University of Göttingen, where, in addition to the study of theology, he applied himself zealously to the study of history, physics, mathematics, and subsequently to Italian, Spanish, and English literature. In 1798 he became assistant to a country clergyman, but not obtaining promotion after waiting six months, he resumed teaching, and went to Othmarschen near Altona, and in 1800 to Frankfurt on the Main. In 1808 Schlosser became joint rector of the school in his native town, an office which he resigned in 1809 because it interfered with his historical studies, and returned to Frankfurt, where he obtained some hours' teaching in the gymnasium and completed his work *Geschichte der bildungstüchtigen Kaiser des östlichen Reichs* (1812). The Prince Primate appointed him professor in 1812 in the newly founded Lyceum of Frankfurt, and when it ceased to exist in 1814 he became city librarian. In 1817 he was called as professor of history to Heidelberg, where he likewise for a time had charge of the library, a duty which he, however, resigned after a few years. In 1822 he visited Paris. His first great historical work, *Weltgeschichte in zusammenhängender Erzählung* (1817-24, second edition, 1839-41), gained him the reputation of being thorough, earnest, and clear-sighted in his researches. After this work there followed, as the result of his studies in Paris, *Geschichte des 18ten Jahrh.* (1823), which attracted general attention and approbation. In the *Universalhistorische Uebersicht der Geschichte der alten Welt und ihrer Cultur* (1824-31) he gave the fruit of many years' study of antiquity, and returned to modern times in the work *Zur Beurtheilung Napoleons und seiner neuesten Tathier und Loebredner* (1832-35), which at the same time may be considered as a work preparatory to a revised edition of his *History of the Eighteenth Century*. A clear, powerful delineation of personal character, a love of truth regardless of every consideration, a sound high moral tone of judging of persons and times, characterize Schlosser's historical writings. In order to bring his earlier researches in a collected form before the public, the *Weltgeschichte für das deutsche Volk* (19 vols., 1842-54) appeared. The earlier portions of it (vols. 1-8) were edited from Schlosser's writings by G. L. Kneigt, the later volumes were edited by the historian himself. Along with *Bericht über die Ausgrabungen für Geschichte und Literatur* (five vols.

1830-35) He died at Heidelberg on 23rd September, 1861

SCHLÖZER, AUGUST LUDWIG VON, celebrated historian, was born in 1735 at Gagstadt in Würtemberg, where his father was a clergyman. In 1751 he proceeded first to Wittenberg and then to Göttingen, to study theology and the oriental tongues, the latter with a view to travel in the East, of which when a mere youth he had formed a plan. He afterwards went as tutor to Sweden, and lived partly at Stockholm and partly at Upsala. In 1759 he returned to Göttingen, and with a view to his projected oriental travels commenced the study of medicine. In 1761 he proceeded to St Petersburg as tutor to the Russian historian Müller, whom he assisted in his studies. He also engaged diligently in the study of the Russian language and history, and in 1765 he was appointed a professor in the Academy. He had now separated from Müller, who envied his talents, and the enmity between them became so great that when Schlozer obtained an appointment to a chair at Göttingen Müller used his influence with the Russian government to prevent his departure. He was able at last to get away, and on reaching Göttingen was installed in the chair of political science. His plan of travel was never executed, and he remained at his post as professor at Göttingen till his death in 1809. The fruit of his residence and studies in Sweden and Russia was his *Allgemeine Nordische Geschichte* (two vols Halle, 1772), and a translation and exposition of Nestor's *Russian Annals* (Göttingen, 1802). At a later period appeared his *Weltgeschichte im Auszuge und Zusammenhange* (two vols Göttingen, 1792-1801). Both in this work and in his lectures on universal history and the history of European states, he has broken new ground, and marked out a new path for future historians. One of the most popular of his works is *Vorbereitung zur Weltgeschichte für Kinder*, which has passed through numerous editions. His political views, and exposure of whatever he considered faulty in the constitutions and arrangements of the German states, are contained in his *Staatsanzeigen*, a journal which reached eighteen vols. His *Correspondence* (*Briefwechsel*, ten vols.) is also important. His life has been written by his son.

SCHMALKALDEN, a town of Prussia, in Hesse Nassau, in a valley at the junction of the Sille and Schmalkald, 34 miles *NNE* of Fulda. It consists of the town proper, which has a double wall and ditch, and of three suburbs, is an antique and picturesque looking place, with dark narrow streets, and houses either framed or entirely formed of wood. The chief objects of interest are two castles, a handsome Gothic church, a town house, hospital, real-school, and other schools, a house in which the Schmalkaldic League was drawn up, and another, now the Krone Hôtel, in which it was signed. The staple manufactures are iron and steel, the materials of which are obtained from extensive mines in the vicinity, there are also large salt works immediately below the town. Pop. (1895), 7888.

SCHMALKALDEN, LEAGUE OF Towards the end of December, 1530, the Protestant princes of Germany assembled at Schmalkalden with a view to form themselves into a defensive league, a step which they were led to take in consequence of certain aggressive measures in contemplation by the Emperor Charles V. The League of Schmalkalden was signed on December 31st by the Elector of Saxony, the Landgrave of Hesse, the dukes of Luneburg, Prince Wolfgang of Anhalt, the two counts Mansfeld, and the cities of Magdeburg and Bremen. The league was joined in the following year by the towns of the Tetrapolitan Confession, by Lubeck, Göttingen,

Brunswick, Strassburg, Ulm, &c., so that it ultimately included seven princes, two counts, and twenty-four cities, representing the whole of Northern Germany, Saxony, Wurtemberg, and Denmark, with portions of Bavaria and Switzerland. John Frederick, elector of Saxony, and Philip, landgrave of Hesse, were appointed leaders of this formidable alliance. The object of the league was the common defence of the political and religious freedom of the Protestants, and the confederacy was at first intended to continue only for six years, but subsequent events induced them, at a meeting of the league on the 24th December, 1535, to renew it for a further period of ten years. At the same meeting it was also resolved to raise a permanent army of 10,000 infantry and 2000 cavalry, the more effectually to carry out the objects of the league. About this time it was joined, among others, by the King of France, Francis I., but it was only from political motives, for he himself was a persecutor of the Protestants in his own country, and Henry VIII of England declared himself its protector. The confederacy received a fuller consolidation by a new Protestant confession, which was drawn up at the instance of John Frederick of Saxony by Luther and other divines, and known as the Articles of Schmalkalden, from the circumstance of their having been signed (February, 1537), like the league itself, at the town of Schmalkalden. These articles were essentially the same as those of the Confession of Augsburg, only they were couched in much stronger language, and revealed the consciousness of the Protestants of the strength which they had acquired since the earlier confession had been drawn up. The emperor was powerless against them, more especially as at this time he was engaged in contests with the Turks and the French. But the Protestants had some occasion for being alarmed when a little later (June, 1538) the Catholics succeeded in organizing a league against them, called the Holy League of Nurnberg, and about the same time a peace was concluded between Charles and Francis at Nice. Add to this that mutual jealousies and the conflict of interests among the members of the league crippled their powers and hindered their harmonious action. Open war broke out between the emperor and the Protestants in 1546. At this time the term of the League of Schmalkalden had expired, and no agreement had been come to for its renewal. But the determination of the emperor 'to reduce to obedience the disturbers of the public peace' reanimated its more ardent members, and inspired them with the resolve to venture purse and person in the cause of religion and freedom. The Schmalkaldic war was the consequence. The army of the league took the field under Sebastian Schurthin. He advanced into Schwabia with the view of barring the approach of the imperial army from Italy, and forced his way to the banks of the Danube. His plan, however, was defeated in consequence of the absurd action taken by the council of war at Ulm, who forbade him to advance into the Tyrol. It very soon became apparent that there were too many leaders. Plans were formed, discussed, abandoned, and the time that should have been appropriated to action was frittered away in fruitless consultations. After some time spent by the opposing armies in unimportant manoeuvres the scale turned in favour of Charles, through the defection of Maurice, duke of Saxony. Charles had previously (July 20) published the ban of the empire against the Elector of Saxony and the Landgrave of Hesse, and now Maurice, in virtue of an imperial decree, took possession of the electorate, and the Protestant army was forced to retreat. The Elector of Saxony, however, soon afterwards succeeded in retaking his electorate, but in other parts

the emperor's arms were successful, and on the 24th of April, 1547, was fought the battle of Muhlberg, in which the Protestant army was completely routed by the emperor, and the leader, John Frederick, taken captive. This defeat brought the war to a close. What the league, however, had failed to get at this time by force of arms was subsequently accomplished through the instrumentality of Duke Maurice, now elector of Saxony, who in 1552 declared war against the emperor. Charles was taken completely by surprise, and was forced on July 31st, 1552, to grant the Treaty of Passau, which secured the religious liberty of the Protestants.

SCHNEEBERG, a town in Saxony, in the circle of Zwickau, on a height, 29 miles s s w of Chemnitz. It contains a parish church, a fine building of latest Gothic, with an altar piece of the Crucifixion, regarded as the master piece of the elder Cranach, and has manufactures of lace and embroidery, and a factory of Prussian blue. There were at one time very extensive mining works here, chiefly of silver and cobalt. They still exist, but have greatly fallen off. Near it are the picturesque castles of Stein, Eisenburg, and Wiesenburg. Pop. (1895), 8285.

SCHNEEKOPPE, or **RIESFNKOPPE**, a mountain belonging to the Riesengebirge, on the frontiers of Prussian Silesia and Bohemia, 12 miles south of Hirschberg. It is the culminating point of the chain, and the highest peak of Northern Germany, having a height of 5257 feet, and is usually considered the principal source of the Elbe.

SCHNORR VON KARLSFELD, JULIUS, a distinguished German painter, born at Leipzig, March 26, 1794. His father was likewise a painter of some note, and by him he was initiated into the rudiments of his art. In 1811 he proceeded to Vienna to further prosecute his studies, and while there produced several works. In 1817 he visited Italy, and after spending about a year in the study of the great masters at Florence, took up his residence at Rome. Here he attached himself to that band of German painters which was headed by Cornelius and Overbeck, and very soon came prominently to the front. His painting 'The Wedding in Cana' attracted so much notice that he was chosen, along with the two painters already named, to paint the walls of the Villa Massimo at Rome. The part of the work executed by him consisted of designs taken from Aristotle, which were received with general approbation. Among other meritorious works produced by him during his ten years' residence at Rome may be mentioned 'Jacob and Rachel, Ruth and Boaz, the Flight into Egypt, and Children brought to Jesus.' He removed to Munich in 1827, having been invited thither by Ludwig, king of Bavaria, and in the same year was appointed professor of historical painting in the Academy of Fine Arts there. He was forthwith commissioned to execute the decorations of the magnificent new palace, and commenced with the state apartments, which were to be decorated with frescoes of scenes from the national poem of the Niebelungenlied. The completion of this work, however, was postponed for some years in order that he might adorn three grand saloons of the Festsaalbau with scenes from the lives of Charlemagne, Frederick Barbarossa, and Rudolf of Hapsburg. This latter work occupied him ten years, and after that he completed the Niebelungenlied frescoes, which extend over five chambers, each of which is named after the chief scene depicted in it, as the 'Hall of Treachery,' the 'Hall of Revenge,' &c. During this period Schnorr was likewise engaged upon numerous other less important works. These are perhaps the most popular of modern works in fresco in Munich. In 1846 he accepted an invitation to become director of

the picture-gallery and professor at the Academy of Fine Arts in Dresden. While here he completed the work by which, perhaps, he is best known in this country, his Illustrations of the Bible, which were engraved and published under the title of *Die Bibel in Bildern* (240 plates, with text, Leipzig, 1852-60). These have been published in this country by Messrs. Blackie & Son, they exhibit wonderful animation, variety, and power. To the Dresden period also belong the oil painting of Luther at the Diet of Worms, and the designs for a window for St Paul's, London. This window was only inserted in its place in 1867, it represents the conversion of Paul on the road to Damascus, and the cure of his blindness. Schnorr died on May 24, 1872.

SCHOLARSHIP, in universities, is the appellation of a certain class of foundations in colleges for the maintenance of students. In Oxford and Cambridge the scholarship is superior to an exhibition, but inferior to a fellowship. In the former university, since the issue of the royal commission, the restrictions as to kinship with the founder have been removed, and except in a very few instances the scholarships are open for competition to all candidates below a certain age, usually nineteen or twenty. The value of these in the English universities varies from £20 to £100. In Scotland there are comparatively few scholarships, but they are generally superior in money value to the English ones, the latter corresponding more to the Scotch bursaries. See **BURSARY**.

SCHOLASTICISM the name given to the system of philosophy taught by the philosophers of the middle ages, who were called *scholastics* or *schoolmen* from the circumstance that their philosophy originated in the schools instituted by and after Charlemagne for the education of the clergy. The philosophy here taught consisted in a collection of logical rules and metaphysical notions drawn from the Latin commentators on Aristotle, especially the pseudo Augustine and Boethius, and from the introduction of Porphyry to the writings of Aristotle. The character of the scholastic philosophy, however, varied considerably at different periods. It has, indeed, no title to be called one system, for it consisted of many systems, at the same time there were sufficient points of resemblance between these systems to make one general designation, as that of scholastic philosophy, applicable to them all. Historians are not agreed as to the exact period of the origin of scholastic philosophy. Those who regard particularly its theological character make Augustine its founder, others consider it as having commenced in the Monophysite disputes of the fifth and sixth centuries. John Scotus Erigena, in the ninth century, is commonly called the first scholastic, though he cannot, however, be regarded as the proper founder of that philosophy. He was the great philosopher of his age, and his doctrines were connected with those of the Neo Platonic system. Philosophy, however, with him, did not assume that complete subordination to theology which was characteristic of later scholasticism. He maintained rather the identity of true religion with true philosophy. The great aim of the schoolmen was to reduce the doctrines of the church to a scientific system. Of such systems the first was that of Peter of Lombardy, who flourished in the first half of the twelfth century. All these systems started with the assumption that the creed of the church was absolutely true, but they were all guided at the same time by the desire to comprehend this revealed truth—to rationalize the dogmas of the church. Based as their philosophy was on this assumption, the criterion of truth and falsehood in matters common to philosophy and theology was not sought in observation and in thought itself,

but in the dogmas of the church. The first period of the schoolmen may be considered as extending from the ninth to the thirteenth century, and is characterized by the accommodation of the *Aristotelian* logic, and of Neo-Platonic philosophemes, to the doctrine of the church. The period begins with John Scotus Erigena and ends with the *Amalricans*, and numbers, amongst other names, those of Berengarius of Tours and his opponent Lanfranc, Damianus, Hilbert of Lavardin, the great Anselm, archbishop of Canterbury, Roscellinus, Abelard, William of Champeaux, Hugh and Richard de St Victor, Peter Lombardus, Peter of Poitiers, and John of Salisbury. The period is marked by the controversies that raged between the Nominalists and the Realists (see NOMINALISM), and which terminated at length in the triumph of the latter. While Erigena had given the impulse, Anselm, with his aphorism *credo ut intelligam*, gave the direction, to philosophical thought in this period. Hugh and Richard de St. Victor, and St. Bernard, indicated a mystical tendency, a reaction against the reigning dialectics, while Peter Lombardus, in his *Sentences*, appealed to positive studies, collecting extracts from the church fathers, without, however, attempting to solve difficulties, and John of Salisbury indicated the current abuses of logic. The second period of scholasticism, extending from the thirteenth to the fifteenth century—from Alexander of Hales to the close of the middle ages, when classical studies were revived and the sciences of nature and human nature began once more to be studied, presents us with the complete development and widest extension of scholasticism, and also with its dissolution. During this period the Aristotelic philosophy became more fully known, and exercised a still more marked influence, Realism was also triumphant, until, towards the end of the period, William of Occam rose up as the champion of Nominalism, and in distinguishing thought from being, and the theoretical from the practical, gave to philosophy a wider range and a freer spirit, and so prepared the way for a higher philosophy. The zenith of scholasticism is constituted by its two greatest masters—Thomas Aquinas, a Dominican (died 1274), and Duns Scotus, a Franciscan (died 1308), who were the founders of the two schools into which the entire movement was thenceforward divided. In discussions concerning universals, whether they existed *in posse* or *in esse*, and concerning human liberty and the grounds of virtue, the Thomists, or followers of Aquinas, exalted the understanding as the highest principle of the mind, while the Scotists, or followers of Duns Scotus, exalted the will. This antithesis of the theoretical and the practical necessarily led to two essentially different tendencies. With the separation of theory and practice, and still more with the separation in Nominalism of thought and thing, philosophy was disjoined from theology, and reason from faith. The scholastics had, by their excessive subtleties, reduced theology to a formal system destitute of all vivifying power, and only of interest to the logical understanding. The result of this was that religious minds turned away from this lifeless theology to take refuge in mystic experiences of the inner life, while others, renouncing theology altogether, sought an outlet for their mental energies in the study of nature and mind. The former of these tendencies culminated in the Reformation, and the latter in modern philosophy. In addition to the names already mentioned there belong to this period those of Bonaventura, Albertus Magnus, Peter Hispanus, Francis Maïron, and William Durandus. The latter, dubbed, according to the practice of the schools, *doctor resolutissimus*, from his skill in solving difficult questions, made a distinction between theological

truth, which rests on the authority of the church, and philosophical truth, which is established, independently of the church, on private conviction, and propounded the strange doctrine that a thing might be theologically true and yet philosophically false, and *vice versa*. In this way was it attempted to reconcile the discordant results of theology and philosophy!

The Reformation, if it did not completely overthrow scholasticism, at least gave it a blow from which it never recovered. It still, however, held a footing in many of the universities up to the seventeenth century, and the authority of Pope Leo XIII has produced a revival of Thomism among Roman Catholics, especially on the Continent. This movement is represented by the *Revue Neo scolastique* of Louvain, founded in 1894, the *Revue Thomiste*, published at Paris since 1894, and the *Philosophisches Jahrbuch* of Fulda, established in 1888, and has produced M. Wulf's work, *Histoire de la Philosophie Médiévale* (1900). See Hauréau, *Histoire de la Philosophie scolastique* (1872–81), Stockl, *Geschichte der Philosophie des Mittelalters* (1864–66), and Erdmann's *History of Philosophy*.

SCHOLIA, explanations annexed to Greek or Latin authors by the early grammarians, who taught the practical part of philology. The writer of such scholia is called a *scholiast*. The names of the scholiasts are mostly unknown. Those, however, of Didymus, John Tzetzes, and Eustathius, the famous scholiast of Homer, have been preserved.

SCHOMBERG, FREDERICK HERMANN, DUKE OF, a distinguished military officer, born at Heidelberg in Dec. 1615, son of Hans Meinhard von Schonberg by the daughter of Lord Dudley. He began his military career under Frederick, prince of Orange, and afterwards went to France, where he became acquainted with the Prince of Condé and Marshal Turenne. He was then employed in Portugal, and established the independence of that kingdom, obliging the Spaniards to recognize the claims of the house of Braganza. He commanded the French army in Catalonia in 1672, and was afterwards employed in the Netherlands, where he obliged the Prince of Orange to raise the siege of Maestricht. For these services he was rewarded with the staff of a marshal of France in 1675, but on the revocation of the Edict of Nantes Marshal Schomberg, who was a Protestant, quitted the French service, and went to Portugal. Being also driven from that country, on account of his religion, he retired to Holland, and subsequently engaged in the service of the elector of Brandenburg. He went to England in 1688 with William III., and after the Revolution was created a duke, and obtained a grant of £100,000. He was sent to Ireland in the following year, to oppose the partisans of James II. Being joined by King William, he was present at the battle of the Boyne, in which he lost his life, July 1, 1690, owing, it is said, to an accidental shot from his own troops as he was passing the river to attack the enemy.

SCHOMBURGK, SIR ROBERT HERMANN, a distinguished traveller, the son of a German Protestant minister in Thuringia, was born at Freiburg June 5, 1804. He early devoted himself to the study of geography and natural history, sciences in which he acquired great proficiency. In 1831 he was sent to survey the island of Anegada, in the West Indies, which, on account of the coral reefs near, occasioned many shipping disasters. From 1835 to 1839 he was engaged in the exploration of Guiana, a commission he undertook at the instance of the Royal Geographical Society of London, and in the execution of which he had to encounter many formidable difficulties. He succeeded in amassing much useful

information regarding the physical features, geology, and natural history of Guiana, which was published from time to time in the *Journal of the Society*. It was in the course of his explorations here that he discovered (January 1, 1837) the *Victoria regia* lily, the finest aquatic plant known, and which is now to be seen in many of our great conservatories. Returning to England in 1839, he received the gold medal of the Royal Geographical Society for a work on Guiana entitled *Travels and Researches during the years 1835-39 in the Colony of British Guiana, &c*. In 1840 he was despatched to make a survey of British Guiana for the government, and on his return in 1844 received the honour of knighthood in recognition of his important services. From 1848 to 1853 he acted as British representative to the Republic of San Domingo, and in 1857 was appointed to a similar post at Bangkok in Siam. During his sojourn at San Domingo he prosecuted his scientific researches with great ardour, and communicated many interesting and valuable papers on the results of his labours to various scientific journals. The reputation enjoyed by Schomburgk was European, a fact evidenced by the number of honours conferred upon him by foreign societies and princes. He died at Berlin in March, 1865. In addition to the works already alluded to he wrote a *Description of British Guiana* (1840) and a *History of Barbados* (1848).

SCHÖNBRUNN, a royal palace in the environs of Vienna. See VIENNA.

SCHÖNEBECK, a town in the government of Magdeburg, Prussia, on the left bank of the Elbe, 9 miles s.e. of Magdeburg. It is a very ancient place, contains a church and synagogue, and has manufactures of white lead and chemical products, a brewery, distillery, and several mills. Pop. (1885), 13,319; (1895), 14,811.

SCHOOLCRAFT, HENRY ROWE, a distinguished American ethnologist and geologist, born at Water-vliet (now Guiderland), in Albany county, New York, March 28, 1793. He entered Union College in his fifteenth year, and studied chemistry and mineralogy under Professor Hall, and is said to have taught himself Hebrew, German, French, and geology in the intervals of his collegiate studies and other occupations. He applied himself after this to the art of glass making, and in 1816 began to publish a serial work on the art, entitled *Vitreology*, but he soon stopped it, the circulation being very limited. In 1817-18 he made a journey to the west, with the object of extending his knowledge of geology and mineralogy, and on his return published *A View of the Lead Mines of Missouri, &c* (New York, 1819), and a narrative, afterwards enlarged, entitled *Scenes and Adventures in the Semi-Alpine Region of the Ozark Mountains of Missouri and Arkansas* (Philadelphia, 1853). In 1820 he was appointed geologist to the expedition despatched by the government to explore the sources of the Mississippi, and of this expedition he published an account in 1821. In the latter year, being appointed secretary to an Indian conference at Chicago, he travelled through Illinois and along the Wabash and Miami rivers, publishing the results of his observations in his *Travels in the Central Portions of the Mississippi Valley, &c*. In 1822, being appointed agent for Indian affairs in the north-western provinces, he there became acquainted with and married a Miss Johnston, an accomplished young lady whose mother had been the daughter of an Indian chief, and henceforth, his marriage with her having stimulated his interest in Indian affairs, he devoted himself with untiring ardour to the investigation of the languages, ethnology, and antiquities of the Indians. From 1828 to 1832 he was a member of the territorial legislature of Michigan,

during which period he managed the finances of the territory, and in 1828 he founded the Michigan Historical Society and the Algic Society of Detroit. In 1832 he conducted a government expedition to the Upper Mississippi, in the course of which he discovered the sources of that river. An account of his journey he published in *An Expedition to Itasca Lake* (New York, 1834). In 1836 he negotiated the purchase for government of 16,000,000 acres from the Indians in the region of the Upper Lakes, and after this he was appointed acting superintendent of Indian affairs for the northern department, and in 1839 chief disbursing agent for the same department. He visited Europe in 1842, and in the following year made a tour, chiefly for the investigation of Indian antiquities, in Western Virginia, Ohio, and Canada. In 1845 he made a census and collected statistics of the Six Nations of New York, publishing the results in his *Notes on the Iroquois* (Albany, 1848). In 1847 he was appointed by the government to prepare an extensive work on the Indians, which appeared under the title of *Historical and Statistical Information respecting the History, Conditions, and Prospects of the Indian tribes of the United States* (six vols. quarto, Philadelphia, 1851-57). Besides the works already mentioned we have from his prolific pen *Algic Researches*, comprising inquiries respecting the Mental Characteristics of the North American Indians, *Thirty Years with the Indian Tribes of the North Western Frontier*, *The Indian in his Wigwam*, and the *Myth of Hiawatha* and other *Legends*, besides poems, lectures, reports, &c. For his *Lectures on the Indian Languages* he received the gold medal of the French Institute. Schoolcraft married a second time in 1847. He died at Washington on December 10, 1861.

SCHOOLMASTERS, ARMY, schoolmasters appointed to teach soldiers and their children in the garrison army schools. They are generally non-commissioned officers or civilians who have passed a competitive examination, and they form a special corps. They rank at first with sergeants, and after eight years' service as warrant officers, and the inspectors of army schools are appointed from their ranks according to seniority and ability. Non-commissioned officers may be appointed as assistant army schoolmasters. For the girls' schools there are army schoolmistresses. (See **MILITARY SCHOOLS**.) There are also naval schoolmasters with similar duties.

SCHOOLMEN, the name given to a number of theological and philosophical writers, or writers who treated theology from a philosophical standpoint during the middle ages from the 11th century to Reformation times. Such were Abelard, Anselm, Alexander Hales, Thomas Aquinas, &c. See **SCHOLASTICISM**.

SCHOOLS, NATIONAL EDUCATION. Of the very earliest forms of public instruction but little is known. In Babylonia there were libraries in the chief towns, which 'were for the use of the people', more than four thousand years ago. Their treatises on agriculture, astronomy, astrology, and government, their tables of laws, and their mathematical formulae, betoken a high degree of generally diffused intellectual culture, and suggest, if they do not imply, some system of public instruction. In Egypt important institutions were early established at Thebes, Memphis, and Heliopolis, wherein were taught mathematics, astronomy, architecture, sculpture, and painting. Amongst the highest castes education was domestic, but generally the children of the Egyptians received instruction together in reading, writing, and arithmetic. The Israelites, after their return from the Babylonish captivity, founded schools so generally as to constitute, at least in outline, a

national system Wherever there were twenty five children a school had to be established, and where there were forty an assistant was appointed. Higher institutions were established in which young men above sixteen years of age received instruction not only in foreign languages and literatures, but also in the philosophy of other countries. The Greeks, from the time of Homer to that of Aristotle, passed important laws and established institutions to realize their educational theories. Solon claimed that children belonged to the state rather than to their parents, and should be educated by the state and for it. The details as well as the principles of education were fully discussed by Pythagoras, Solon, Socrates, and Plato. The last named insisted that a state can advance only through the wise regulation of the instruction of its people. The subjects which should be taught were those relating to the art of war, music (including playing on the lyre), reading, writing, arithmetic, mathematics, and astronomy. In his Republic, Plato argues for compulsory state education. The Roman state made regulations as to the instruction to be given to children, and families received assistance from teachers who gradually formed elementary schools, which were attended by both boys and girls, as is evident from the story of Virginia by Livy, about 450 B.C. For several centuries the subjects of instruction were limited to reading, writing, and arithmetic, but when a taste for Greek literature had been formed, the study of that language was added. Hadrian not only founded the *Atheneum* in the Capitol, but also appointed grammarians, who were paid by the state. Before the end of the second century, institutions modelled on that in Rome were founded and maintained in every important town in Europe. Roman civilization organized a system of higher public schools and the results of state patronage appeared in the flourishing seminaries of Vienne, Lyons, Bordeaux, Clermont, and other towns. From the fifth to the twelfth century the schools of most importance were ecclesiastical, being generally connected with the monasteries. Charlemagne made noble efforts to reach the lowest of the people by an imperial system of schools, but he was only partially successful. The subjects of instruction in the conventual schools were the seven liberal arts, which were divided into two courses of study, known as the *trivium* and the *quadrivium*. The former included grammar (Latin) dialectics (logic), and rhetoric, and the latter included music, arithmetic, geometry, and astronomy.

England—While the Reformation impulse in Scotland carried education to the children of the artisan and the peasant, in England it reached no lower than the middle classes. Cranmer's comprehensive plan failed, and towards the close of Queen Elizabeth's reign educational patronage, through grants and private bequests, was confined generally to the least necessitous. Not until the beginning of last century was the question of public instruction discussed, and at that time the standard was almost incredibly low. 'It is not proposed', said Dr Bell, in claiming support for his model system about 1820, 'that the children of the poor be educated in an expensive way, or even taught to write or cipher'. As no government could then venture to legislate on this subject, public instruction was promoted by societies, chiefly by two—the British and Foreign Society, originated in 1805, and the National School Society of the Church of England, originated in 1811. Not until 1839, when the minutes of a special committee of the privy-council were published, was there any parliamentary action to lessen the evils of popular ignorance, if we except an annual grant of £20,000—first given in 1833—given for a few years pre-

viously to aid in building schools. In these minutes of 1839 the present vast educational movements in England have their origin, and to the early and skilful guidance of Sir James Kay Shuttleworth is the country indebted for their comprehensiveness and efficiency. All these agencies are still continued, but a new educating power was introduced by the education act of 1870, the primary aim of which was to secure suitable accommodation to meet the requirements of the whole country. It provided that where denominational or voluntary effort had failed, or where there was a deficiency of school accommodation, school boards were to be established *compulsorily*, and they might be established *voluntarily* in districts where it might be necessary to enforce the attendance of children at schools already provided. Further important provisions were made by the elementary education act of 1876, according to which every school district not having a school board must establish a school attendance committee that might make and enforce by laws for compulsory attendance. This act rendered it illegal to employ any child under ten, or to employ a child over ten who had not obtained a certificate of proficiency in reading, writing, and elementary arithmetic, or of previous due attendance at a certified school, unless such child, being of the age of ten years or upwards, was attending school in accordance with the provisions of the factory acts, or of any by law of the local authority made under any of the elementary education acts since 1870. By an act of 1880 (*Mundella's*) every school board and school attendance committee was compelled to make and enforce by laws for compulsory attendance. School age was from 5 to 14, but whole or partial exemption might be granted after a certain age fixed by the by laws (but not less than 10 years), and after a certain standard had been reached, not lower than the fourth.

Under the education act of 1876 school attendance committees were appointed in all the boroughs not under the jurisdiction of school boards, and in all those unions of which any portion was not under the jurisdiction of a school board, besides such committees for parishes under the jurisdiction of urban sanitary authorities. Regarding the provisions for school attendance of children employed in factories, see **WORKSHOP AND FACTORY REGULATION**.

Not till 1853 did the education department lay down a set curriculum for schools. This was a very modest test to determine whether the scholars had been sufficiently well taught to justify the payment of a capitation grant. Children between 9 and 11 years of age were expected (a) to read simple narratives with intelligence, (b) to work from dictation a sum in simple subtraction, multiplication, or division correctly, and (c) to write on a slate from dictation, with correct spelling, a simple sentence twice read to them, first consecutively, and then by one word at a time. Children over 11 years of age were expected (a) to read books of general information fluently, (b) to work from dictation a sum in one of the four first compound rules of arithmetic correctly, (c) to write on paper from dictation, in a neat hand and with correct spelling, two or three simple sentences twice read to them, first consecutively, and then by a few words at a time, (d) to point out the parts of speech in the same sentence (orally), (e) to answer questions in the tables of weights and measures (orally), and (f) to answer a few elementary questions in geography (orally), and on other subjects of useful information—the questions to be adapted to the course of study pursued in the school. From this, by slow and slight degrees the curriculum has developed until to day it is as follows—English (including reading, recitation, writ-

ing, composition, and grammar), arithmetic, drawing (boys), needlework (girls), object-lessons (on geography, history, and common things), singing, and physical training—to be taken as a rule in all schools, algebra, Euclid, mensuration, mechanics, chemistry, physics, physiology, hygiene, botany, agriculture, horticulture, navigation, Latin, French, Welsh (in Wales), German, book keeping, shorthand, domestic science—one or more of these to be taken when the circumstances of the school, in the opinion of the inspector, make it desirable, cookery, laundry work, dairy work, household management (with special grants) for girls, at the option of school managers, cottage gardening, manual instruction (with special grants) for boys, at the option of school managers, and cookery (with special grants) for boys in seaport towns, at the option of school managers. Any subject other than these may be taken if a graduated scheme for teaching it be submitted to, and approved by, the inspector. Instruction may be given in religious subjects, but no grant is made in respect of any such instruction. Children under 6 years of age were not formally recognized until the code of 1862, according to which a capitation grant was paid for them, 'subject to a report by the inspector that such children are instructed suitably to their age, and in a manner not to interfere with the instruction of the older children'. Now it is required that the course of instruction in infant schools and classes should, as a rule include suitable instruction in reading, writing, and numbers, simple lessons on common things, appropriate and varied occupations, needlework, drawing, singing, and physical exercises. The varied occupations include kindergarten games, Froebel's gifts, bead work, stick work, paper work, free weaving, clay modelling, brush work, &c.

Payment by results based on individual examination of the scholars, on lines similar to those in Scotland, obtained till 1896. In this year inspection was substituted for examination, except in the case of schools which were bordering on inefficiency. A still further improvement was made in 1900, when what is known as the 'block grant' was introduced. This abolished all separate grants on the class subjects, specific subjects, music, organization and discipline, drawing, and needlework, and substituted a comprehensive capitation grant based on the average attendance of scholars. The most beneficial result of this has been that managers are completely free in the choice of the curriculum of a school, subject to certain minimum requirements. The only subjects on which separate grants are now paid are cookery, laundry, dairy work, household management, cottage gardening, and manual instruction, and in these the grant is paid on the basis of the amount of time given to a subject.

'Evening schools for young persons between the ages of 12 and 17 among the respectable and well conducted portion of the labouring classes' were officially recognized in 1851, and were allowed to receive grants—for the purchase of books and maps at reduced prices, and in aid of the salary of certificated teachers employed in them. In 1855 a capitation grant was given for scholars in night schools. Pupils were not allowed to attend both day and evening schools. The code of 1862 provided that for every scholar who attended an evening school more than twenty four times the sum of 4s should be paid, subject to deductions of one third of this for each case of failure in reading, writing, and arithmetic. More generous payments were made under the code of 1871, but not until 1882 was any grant given for special, i.e. 'class' or 'specific' subjects, and then for not more than two, on condition that the elementary

subjects were also taken. In 1882 the curriculum was still further extended, and such pupils as had passed Standard V in a day school were not required to take the elementary subjects. An entirely new constitution was given to such schools under the 'Evening Continuation School Code' of 1893. This substituted inspection for examination, gave more generous grants, according to the time given to each subject and the general quality of the work done, offered a very much more advanced and comprehensive curriculum, and entirely removed the maximum age limit. Evening schools were thus raised to the dignity of a separate system, and in many cases the work done in them was on the same level as that done in secondary and technical schools. The subjects taught in them included reading, writing, arithmetic, English geography, history, life and duties of the citizen, French, German, Welsh, Latin, Euclid, algebra, mensuration, elementary physiography, elementary physics and chemistry, science of common things, chemistry, mechanics, sound, light and heat, magnetism and electricity, human physiology, botany, agriculture, horticulture, navigation, book keeping, shorthand, vocal music, domestic economy, needlework, cookery, laundry work, dairy work, drawing, manual or technical instruction, suitable physical exercises, military drill, housewifery.

In 1891 an elementary education act provided that the parents of every child should have the right to demand free education. The age for half time exemption was raised from 10 to 11 in 1893, and from 11 to 12 in 1899, whilst in 1900 school authorities were given power to raise the age for total exemption from 13 to 14, and magistrates were empowered to inflict a fine of 20s (previously 5s) for non attendance at school. The scope of elementary education was most widely extended in 1893 by an act which required that deaf children between 7 and 16 years of age, and blind children between 5 and 16 years of age, should be educated, and again, in 1899, by an act requiring that defective and epileptic children between 7 and 16 years of age should receive education. Whilst school boards and managers of voluntary schools had for many years established what were called 'higher grade' schools, in which more advanced instruction was given, it was not till 1900 that the board of education formally recognized such institutions, by its minute providing for 'Higher Elementary Schools'—with a special four years' course of instruction, and higher rates of grants.

England has never yet had anything approaching a national system of secondary schools. Secondary schools have, thus far, only been subsidized by public money. The Local Government Act, 1888, and the Technical Instruction Act, 1889, both gave to local authorities certain moneys, and the power to raise money by a rate limited to a penny in the pound, such moneys to be spent in supplying, or helping to supply, technical or manual instruction. Much of this money was given to secondary schools to enable them to build science laboratories, and to supply technical and manual instruction. Schools accepting such grants had to accept a conscience clause, and allow representation of the local authority in their management. A further large sum of money was given to local authorities by the Local Taxation (Customs and Excise) Act, 1890, a large part of which might be used by them to promote technical education. A considerable amount of this money has been given in grants to institutions giving secondary education.

It has always been possible, to a certain extent, for some of the pupils in secondary schools to earn

grants from the Science and Art Department, South Kensington, and when, in 1896, grants were given to 'science schools' (under the Science and Art Department) on the basis of attendance and efficient work, endowed secondary schools put themselves under the South Kensington Code. The first approach to something like the beginnings of a national system was made administratively by clause 7 in the Science and Art Directory, 1897, which says 'In counties and county boroughs in England which possess an organization for the promotion of secondary education, such organization, if recognized by the department, may notify its willingness to be responsible to the department for the science and art instruction within its area. In such cases grants will in general be made to managers of new schools and classes, only if they are acting in unison with such organization'. Since 1896 all secondary schools earning grants as science schools have been subject to inspection by inspectors from South Kensington, whilst by the Board of Education Act, 1899, the governing body of any secondary school could, on application and by payment of a fee, have its school inspected and reported on by the Board of Education.

Wales has been much more zealous and much more fortunate than England in respect to secondary schools. It has had a system of such schools since 1889, established under the Welsh Intermediate Education Act, 1889. This act required that a 'joint education committee' should be constituted for each county in Wales, and for Monmouthshire. Three members of each committee were to be nominated by the county or borough council, and two by the lord president of the privy council. Any assistant charity commissioner was to have the right to attend the meetings of these committees, but not to vote. The work of a committee was to prepare a scheme, or schemes, for the county, to draw up a list of education endowments available, and, if they thought fit, to recommend the council to levy a rate, not exceeding a halfpenny in the pound. Such scheme, or schemes, had to be approved by the charity commission and the education department in case of dispute. The schools receive a grant from the treasury, according to their efficiency, in proportion to the amount contributed by the local rate. Every school must have a conscience clause. All schemes are administered by governing bodies. In the county boroughs there is only one governing body, but in the counties there are two—the county governing body and the local governing body (for particular districts or schools). These governing bodies are composed of representatives of the councils, university colleges, local government authorities, and elementary schools. Women are eligible to act on them, and in some cases their election is compulsory. Up to 1897 the schools were inspected by assistant charity commissioners, and examined by persons appointed by the governing bodies, but since then a Central Welsh Board has been established to take charge of the inspection and examination. In 1899 all the powers exercised by the charity commissioners were transferred to the Board of Education.

The examinations are taken with the object of obtaining the 'senior certificate' or the 'junior certificate', the former being up to the level of the matriculation of the University of Wales, and the latter about equal to a pass in the junior local examination of Oxford and Cambridge. The curricula include—Scripture, English, history, arithmetic, algebra, geometry, trigonometry, geometrical conics, analytical geometry, statics and dynamics, differential calculus, Latin, Greek, Welsh, French, German.

VOL. XII.

man, mechanics, physics, chemistry, botany, physiology, geography, geology, agriculture, book keeping, shorthand, music, drawing, domestic economy (including hygiene), manual instruction, cookery, needlework and cutting out, practical science. In 1900 there were 94 schools with 7445 pupils on the rolls, and more than 75 per cent of the children in the schools came from elementary schools.

In 1902 Mr A. J. Balfour, on behalf of the government, introduced an education bill into the House of Commons, which proposes to make county councils, county borough councils, and non county borough councils the local authority for elementary, secondary, and technical education, and the councils of boroughs with populations over 10,000, councils of urban districts with populations over 20,000, the local authorities for elementary education only.

Scotland—In Scotland the educational views of John Knox and his colleagues led the way to a national system of education, which, though fore-shadowed in the First Book of Discipline (1560), was not brought into existence till a considerably later period. The liberal and statesman like proposals of the Book of Discipline were partially secured as early as 1616 by an act of privy council, when the bishops and heritors were empowered to establish a school in every parish, and were fully ratified by legislative enactment in 1633. Latterly, in every parish there was a school giving not only elementary instruction, but often the higher teaching required to equip pupils for the university. The parish school, the grammar school, and the university have thus long been features of Scotland, but as the population crowded into towns, existing educational agencies failed to meet public wants. As thousands grew up untaught, what was needed was an extension of agencies similar to those which had been already established, but as differences of opinion prevented legislation, the system of privy council grants, which was framed for educational conditions in England quite different from those of Scotland, was gradually taken advantage of, and it accomplished much good. It improved existing schools, and added many others, it created five normal seminaries, it increased the number of qualified teachers, and diffused the benefits of inspection, but it weakened the special connection of the elementary schools with the universities. Various attempts were made to preserve and extend this connection by a national system, but unsuccessfully, until 1872, when the education act now in operation was passed. This act provides that a school board shall be elected in every parish and burgh, and that every school board shall adopt the means prescribed, so that efficient and suitable education shall be provided for every child of school age within its district, and that every child shall attend school from five to thirteen years of age, unless when a certificate of satisfactory attainments has been granted by an inspector. For these ends power has been given to every school-board to borrow money to build schools, to impose an annual rate to repay the loan and maintain the schools, and to compel the attendance of neglected children. While a uniform system of local management has been introduced for all rate supported schools, the act provides for the maintenance of separate or denominational schools under certain restrictions. The management of the whole system was vested in 'the Scotch education department', or 'a committee of the privy council on education in Scotland', but a temporary board of education was appointed to assist in organizing school districts and in arranging details, and continued to act for some years. By the Secretary for Scotland Act, passed

in 1885, the Scotch education department was re-constituted and put under the new Secretary of State for Scotland.

The difficulty regarding religious instruction has hardly been felt. The preamble states that it has been the custom in the public schools of Scotland to give religious instruction to children whose parents did not object, and that 'it is expedient that managers of schools shall be at liberty to continue the said custom', and almost without exception the school boards have resolved that the religious instruction shall be based, as hitherto, on the Bible and Shorter Catechism, subject to the conscience clause. In 1878 an act was passed to amend the law in regard to elementary education, by fixing the age at which a child of school age may enter employment, the number of hours he may be employed, &c. Even casual employment in the streets was not allowed under this act after 7 p.m. in winter or 9 p.m. in summer, unless a child was between 10 and 14 years of age, and had obtained a labour certificate or a permit for occasional employment from a school board. In 1889 a sum of money was handed over from the treasury to the Scotch education department, by whom it was applied to secure the remission of all school fees for children in standards 1 to 3, and the partial remission of fees in standards 4 and 5. Entire relief from fees was given to standards 4 and 5 in 1890, all children, irrespective of standard, were freed in 1891, and all between 3 and 15 years of age in 1893.

The mistaken and mischievous principle of payment by results, i.e. so much money grant for each pass in reading, writing, and arithmetic, which was introduced by Mr Robert Lowe (afterwards Lord Sherbrooke) in 1861, continued practically unmodified till 1886, when standards 1 and 2 were relieved from individual examination and received graduated grants. In 1890 individual examination as the basis for grants was abolished, and a 'merit grant' substituted, i.e. payments were made according to whether the inspector reported the work of the school as a whole as being fair, good, or excellent, after examining the children individually. Individual examination was entirely abolished in 1897, and grants were paid according to the average attainment, the general merit of the school work in elementary subjects, and for certain separate subjects, viz. vocal music, needlework, class subjects, and specific subjects.

The curriculum, up to 1899, was about the same as that in the English schools, but an additional stimulus to good work was introduced in 1892 in the form of a merit certificate. This was given to any scholar over 13 years of age (now over 12) who showed thorough proficiency in the three elementary subjects in two class subjects, and in all the three stages of a specific subject. In 1899 a complete and comprehensive change was made both in organization and curriculum. Schools were to be organized in (a) advanced departments, in which only those who have obtained a merit certificate may be scholars, (b) senior division, (c) junior division, and (d) infant division, for those who have not obtained a merit certificate. The aim of the curriculum, in all schools other than the advanced departments, is to be 'the attainment of the merit certificate stage by easy gradations'. To this end all divisions must take physical exercises, needle work (girls), singing, drawing, learning of poetry, reading, writing, and arithmetic. The junior division must also take nature knowledge, practice in speaking English, and first notions of geography, and the senior division nature knowledge, English composition and grammar, geography, and history.

In the advanced departments must be taken English, history, geography, arithmetic, drawing (as a rule), and such instruction in languages, mathematics, and science—'by teachers properly qualified in each subject'—as the education department, 'having regard to the circumstances of the school, shall determine'. Grants are also made for attendances at approved courses in experimental science, manual instruction, cookery, laundry, dairying, dressmaking, and household economy. Power was given to local authorities to establish 'higher grade schools or departments'. For such schools a course of instruction, extending over at least three years, must be approved by the education department. Subjects to be taught include history, English literature, mathematics (geometry and mensuration—theoretical and practical—and higher arithmetic and algebra), drawing, experimental science, modern languages, needlework and dressmaking, cookery (girls), wood work, ironwork, clay modelling (boys), book keeping, shorthand, typewriting, laundry work, housewifery, dairying, gardening, &c. The education given may be either predominantly scientific and technical (higher grade science schools), or predominantly commercial (higher grade commercial schools) or there may be given a course specially suited to girls or to special classes of pupils. In all higher grade schools English, history, geography, higher arithmetic and drawing must be taught, and the instruction therein must follow certain prescribed lines. Pupils in higher grade science schools must take, in addition, mathematics, experimental science, and, as a rule, some form of manual work, whilst pupils in a higher grade commercial school must take, as a rule, one or more modern languages, book keeping, shorthand, and knowledge of commercial products. All higher grade schools must have a special staff of duly qualified teachers and suitable premises. Capitation grants, increasing with each additional year of study, are given, according to the number of hours attended in a course. School boards have power under the Technical Schools (Scotland) Act of 1887 to establish technical schools or departments, either as day or evening schools. In 1901 the 'evening continuation schools' were supplanted by the 'continuation classes', which may be held during any part of the day, morning or evening, and are open, without any restriction as to age, to any pupils who are free from the obligation to attend school in terms of the education acts. These classes are organized as follows—Division I, preparatory classes for the completion of general elementary education, in which the subjects of instruction are English (reading, spelling, and composition), arithmetic, drawing and one or more of the following history, geography, and nature knowledge. Division II, specialized instruction (elementary) in such subjects as may be of use to pupils who are engaged in or preparing for any particular trade, occupation, or profession. Before a pupil can attend such classes he must as a rule, (a) have obtained a merit certificate, (b) have attended in a previous session at least thirty meetings of a class conducted under Division I, and obtained a certificate from the manager of such class of satisfactory conduct and diligence, or (c) be in attendance during the same session at a class in Division I. The subjects in this division consist of groups under the heads English subjects, languages, commercial subjects, art, mathematics, science, applied mathematics and science, and hand work. Division III, specialized instruction (advanced), which may be regarded as a development of the subjects of Division II, must extend over several years (at least three, as a rule),

and be arranged with a view to fitting students for the intelligent practice of some particular industry or occupation. The conditions for admission to the first year of any course in Division III are the same as those for the corresponding classes in Division II. Division IV, auxiliary classes, which comprehend classes for instruction in physical exercises, military drill, music, or any other subject approved by the education department. Grants given to such classes are not to total more than three fourths of the expenditure actually incurred by managers for the maintenance of the classes. Managers may, subject to the approval of the education department, provide junior scholarships to students in Divisions I and II, and senior scholarships to students in Division III.

An act to make provision for the building of schools for blind and deaf mute children was passed in 1890. Parents had been declared to be responsible for the education of their children in the 1872 act, and since the 1892 code grants have been paid for the teaching of blind and deaf mute scholars in any school or institution approved by the education department.

The act of 1872 took the management of secondary schools from town councils, which had previously had charge of the burgh schools, and gave it to the school boards. Not until empowered by the act of 1878, however, were the school boards allowed to spend any moneys from the school funds. Still further funds and powers were given by the Technical Education Act, 1887, the Local Taxation (Customs and Excise) Act, 1890, the Education Act, and Local Taxation Account (Scotland) Act 1892. The act of 1892 specially set apart a sum of money for providing inspection and examination for secondary schools, and for providing secondary education in urban and rural districts in Scotland. To carry out the latter, secondary education committees were established for each county, and for the burghs of Edinburgh, Glasgow, Aberdeen, Dundee, and Leith, and for Govan parish. These committees are elected for three years, and consist of an equal number of representatives of the county and school-boards, with the addition of one of H.M. inspectors, nominated by the education department, representatives of specified local endowments and—where any money was provided by the local authority under the 1890 and 1892 acts—representatives, not exceeding one third of the whole committee, of the local authority. The proceedings of these committees were to be regulated by minutes laid down by the committee of council on education for Scotland, and approved by parliament. Each burgh or county receives a proportionate amount of the total grant available, and each committee has to draw up a scheme for its administration and submit it for the approval of the education department. The education department lays down the principle that 'the primary object of the funds is the promotion of higher education—which may, with sufficient exactness, be defined to be systematic education beyond the stage of the merit certificate', and says that provision for the purpose may be made in two forms: (i) by grants to suitable schools, and (ii) by bursaries and free scholarships to individual pupils. The grants to the schools 'should be determined solely by consideration of the needs of the school', and not upon the basis of 'individual successes in the leaving certificate examination'. In August, 1901, there were 93 schools working under this scheme, of which 32 were higher class public schools under the management of school boards, 25 were endowed schools, and 36 were private schools. The number of pupils on the rolls of public and endowed schools was 18,215.

The curriculum of the schools is mainly determined by the syllabus for the leaving certificate examination, which is held in June of each year. The following subjects are included in the examination—English (including questions on modern history, literature and geography), Latin, Greek, French, German, Spanish, mathematics (including arithmetic), and book keeping, with commercial arithmetic. Certificates of three grades—lower, higher, and honours—are given in each of these subjects except book keeping and commercial arithmetic and Spanish, for which only one grade of certificate is given. Mathematics includes algebra, trigonometry, logarithms, analytical geometry, dynamics, and geometrical conics.

Ireland—The educational system in Ireland is simpler in its details than that of England, but historically the experiments in both countries have nearly the same limits. Although in 1812 the commissioners of education recommended the introduction of a system 'from which should be banished even the suspicion of proselytism, and which, admitting the children of all religious persuasions, should not interfere with the peculiar religious tenets of any', and intrusted the fulfilling of their recommendation to the Kildare Place Society, it was not until 1831 that the system now in operation was instituted. Strong opposition had been raised to reading even the Douay version of the Scriptures in the schools under the Kildare Place Society, and after various proposals had been rejected it was resolved to adopt a national system, which should afford a combined literary and a separate religious education. Roman Catholics and Protestants were expected to constitute local committees for the joint management of the schools, and the clergy of different communions to give religious instruction at separate hours, and the trained school master was intended to harmonize the dissimilar elements of conflicting factions. The theory was plausible, and British statesmen lauded the experiment, it has been fully tested, and in its original aim it has signally failed. Continued concessions have changed its character, and the results of more than forty years' discussion and toil appear in the last annual report. From a concession made in 1839, a new character was given to the whole system, the concession was, that schools to the building of which no government grant had been contributed should be under the sole control of the patron, who had the right to decide whether any, and, if any, what religious instruction should be given. These schools are described as non vested schools, the rule regarding them is 'For schools *not vested*, and which receive no other aid than salary and books, it is for the patrons to say whether any, and, if any, what religious instruction shall be given in the school room, but if they do not permit it to be given in the school room, the children whose parents or guardians may so desire must be allowed to absent themselves from the school at reasonable times for the purpose of receiving such religious instruction *elsewhere*'. In the vested schools, that is, schools to which the commissioners have given grants for building, 'such pastors or other persons as shall be approved of by the parents or guardians of the children shall have access to them in the school room' for 'religious instruction at suitable times'. There are thus two classes of national schools in Ireland the *non vested*, in which the patron has absolute control regarding religious teaching, and to which the Roman Catholic patron does not admit a Protestant clergyman to give religious instruction, nor the Protestant patron a Roman Catholic priest, and the *vested*, to which at suitable times the Pro

testant and the Roman Catholic can claim admission. In 1892 an act was passed which enforced compulsory attendance at schools in boroughs and townships, provided for partial or entire abolition of school fees, and set apart a grant of £210,000 per annum (in place of the abolished school fees) to increase the salaries of teachers. The local managers of schools are appointed by the patron (giver of the site) or trustees, subject to the approval of the commissioners. These managers have to be responsible for the good government of the school, and are under obligation to visit the schools frequently, and to see that the regulations of the national board are carried out properly. They appoint head and assistant teachers and workmistresses, but the commissioners appoint the monitors from among the best pupils, on the recommendation of the district inspectors. The managers may dismiss any teacher, as also may the commissioners, or fine, reprimand, or otherwise punish them. There are eighty-nine 'model schools', which belong to the board, and are directly managed by and under the control of the commissioners. Pupil teachers are recognized only in model schools. A monitor must be between 12 and 16 years of age, and a pupil teacher at least 16, when appointed. The term of service for monitors is five years, and for pupil teachers two years. Evening schools are conducted in connection with day schools, they must be open for three evenings each week and for two hours each evening, and are not examined for certain grants unless they have been at work for six continuous months. Some schools have farms attached to them, on which instruction is given in the theory and practice of agriculture, gardening, &c., other schools have gardens, and the pupils receive instruction in cottage gardening, poultry management, bee keeping, &c. In all national schools, except such as are in large towns, boys of the fourth and higher classes must be taught the theory of agriculture. At Glasnevin in Dublin county, and at a place near Cork, are two institutions belonging to and entirely managed by the commissioners, at which agriculture and the cognate sciences—dairying, horticulture, agricultural chemistry, milk analysis, creamery management, &c.—are taught, and teachers are trained for 'school farms' and 'school gardens'. All books, maps, casals, and other school supplies are, in the first instance, provided free to all national schools by the commissioners, and subsequent supplies are generally charged at cost prices. There are five training colleges for teachers, four of which are denominational, and one is undenominational and entirely under the control of the commissioners. The course is either one year for teachers who are already classed and in charge of schools, or two years for others. There is a pension scheme for teachers, to which they contribute. School inspectors are appointed after competitive examinations conducted by the civil service commissioners, inspectors' assistants being, as a rule, selected from national teachers of the first class. The following subjects are compulsory in all schools—reading, writing, arithmetic, spelling, grammar, and geography, together with agriculture in rural schools for boys, and needlework for girls. Besides these, drawing and vocal music are taught, and the following extra subjects—classics, French, Greek, German, instrumental music, physical science, chemistry, hygiene, geometry, algebra, agriculture, dressmaking, and other industrial branches. In 1878 an Irish intermediate education act was passed, which established an examination board, with results fees. The pupils of all schools, confessional and other, including the schools of the 'Christian Brothers', are

admitted to the examinations held by this board, and share in the fees paid according to the success of the candidates. A local taxation (customs and excise) act, passed in 1890, secures a considerable grant for the intermediate education board, and this is largely used for increasing the results fees. The examinations are open to pupils over 13 and under 19 years of age. On all the students who enter, a capitation fee is paid if ten per cent of them pass. If over eighty per cent pass, a maximum grant is paid, and from this down to ten per cent there is a sliding scale. The average fee for 1900 was £10, 9s 11d per student who passed. Exhibitions varying in amount, but not more than £20 in the junior, and £30 in the middle, and £50 in the senior grade, tenable for one year only, are awarded, and paid to the managers of the school chosen by the student and his parents for his further education. The subjects for the examinations include Greek, Latin, French, Celtic, English, German, Spanish, Italian, domestic economy, plane trigonometry, algebra and arithmetic, Euclid, book keeping, natural philosophy, chemistry, botany, drawing, music, and shorthand.

The money originally devoted to intermediate education, under the act of 1878, was the annual interest derived from the sum of £1,000,000 paid from the funds of the disestablished Irish Church, and administered by the unpaid board of commissioners of intermediate education. The money derived from customs and excise (1890 act) was used to establish examinations in commercial courses for the middle and junior grades, and a preparatory grade for students between 12 and 14 years of age. These examinations include the subjects of book keeping, commercial history and geography, foreign weights and currencies, and commercial terms in foreign languages. No school can receive grants unless it is subject to a prescribed 'conscience clause'. There is no inspection of the schools on behalf of the board of commissioners, and the inevitable outcome is an extreme condition of grant-earning competition amongst the schools.

France—Although the Reformation spirit failed to influence France as it influenced Germany, Switzerland, Holland and Britain, it stimulated the desire to advance, and consequently, in the meetings of the states general, held at Orleans and at Blois in 1560, 1576, and 1588, the want of elementary schools was anxiously considered, the attention of the king was directed to it, and the nobles went so far as to demand that 'parents who neglected to send their children to school should be subjected to compulsion and fine'. No progress, however, was made for the next hundred years, and the higher classes continued to be indebted to the church for educational benefits. The instruction of the people began at first to be promoted by societies, conspicuous among which was that of the 'Brethren of the Christian Schools', originated in 1679, and having under their care, in 1785, about 30,000 children of the poor and working classes, and in less than a century later, in 1848, upwards of 1,351,000, but their labours benefited the towns only, because one of their rules, forbidding them to serve in parties of less than three, rendered their conducting schools in rural districts impracticable, owing to want of funds. Excellent laws were passed from time to time, but in the unsettled state of the country they could not be enforced. National schemes continued to oscillate between extravagance and parsimony, until Napoleon I at the beginning of last century began a vast educational enterprise, by which he hoped to found 'a new society', free alike from the injustice of feudalism and the con-

fusion of anarchy, but he had time and opportunity to deal only with the higher departments of learning. Not until thirty years later was any thorough legislation attempted. The difficulties to be overcome were extraordinary. As late as 1834 it appears from carefully prepared reports that of 20,000 communes provided with schools, scarcely 'one half had schools of their own, in the other half the school was held in a barn, in a cellar, in a stable, in the church porch, in the open air, in a room which served at the same time as the dwelling place of the school master and his family, where his meals were cooked and his children were born. Where school premises existed, they were often no better than their less pretentious substitutes, they were often hovels, dilapidated, windowless, fireless, reeking with damp', &c. With these discouraging conditions M. Guizot, assisted by M. Cousin, had resolutely grappled, and to remove or remedy them had introduced a comprehensive measure which became law in 1833, and constitutes the foundation of the present system of primary education in France. This law made obligatory on the communes what was previously optional, and gave to France a really national system. The obstacles which had hitherto baffled statesmen were overcome by this law associating in the work of national education the commune, the department, and the state—a combination very much the same as if in Britain the parish, the county, and the government were conjointly responsible for the education of the people. Although various modifications have been made in M. Guizot's law, its fundamental principles have been preserved. In each department there is an educational council, consisting of the prefect as president, the inspector of higher education as vice president, four general councillors, elected by their colleagues, the director of the normal school for males, and the directress of the normal school for females, two male and two female teachers elected by the teachers of the department, and two inspectors of primary schools nominated by the minister of education. The departmental council has great power. By an act passed in 1881 primary instruction became gratuitous in France, and by another passed in 1882 attendance at school is now compulsory for all children between the ages of 6 and 13 years complete. Such education may be given in a public or private school, by tutors or by the parents, but in all cases the children have to undergo public examination, and if the pupils privately educated do not pass the required test, the parents must send the child to a public school forthwith. The communal school boards are intrusted with ample powers for enforcing attendance, the punishment of defaulting parents, the granting of dispensations to children, the examination of children privately taught, and the disposal of the school funds. The law of 1882 also abolished religious instruction in the schools, and by another law, passed in 1886, all teachers in the public schools must belong to the laity. Boys' schools are taught by males, girls' and mixed schools by females. Every commune as a rule must provide one primary school, though in exceptional cases more than one may combine to support a school. The subjects of instruction are reading and writing, the French language and the elements of literature, geography, especially that of France, the more common notions pertaining to law and political economy, the elements of the natural, physical, and mathematical sciences, and their application to agriculture, hygiene, and the industrial arts, manual training, and the use of implements belonging to the chief trades, instruction in morality and civic duties, the elements of drawing and music, and gymnastics. In 1886

an act was passed for the complete and thorough organization and regulation of 'higher primary schools' and their courses. These higher primary schools provide for a more specialized form of elementary education, and constitute the finishing school for those who cannot go to the secondary schools. The course is for three or four years, and is intended to be (1) a continuation and completion of the studies begun in the elementary schools, (2) a practical introduction to such literary, scientific, and general studies as bear directly on the various occupations of life, (3) a general training in hand and eye work, which will develop dexterity and taste in manual work and form an introduction to any manual industry, or (4) instead of (2) and (3) when desired a definite technical training in some one of the local industries, corresponding, as far as possible, to a regular practical apprenticeship. The schools are day schools, and in many cases boarding schools. No child is admitted to such schools unless he or she has obtained the 'certificate of primary instruction', and has passed a year in the highest standards of the elementary schools. This certificate is awarded for success in a uniform annual public examination upon the subjects taught in the elementary school, open to all children 11 years of age. No fees for instruction in these schools can be charged. The funds are provided partly by the local authorities and partly by the central educational department. There is an extensive and general system of scholarships provided by the state, and often supplemented by the department and commune. These are awarded, according to the results of a strict competitive examination, to those who would otherwise be unable to go to the higher primary schools. If held at a boarding school the scholarships are proportionately increased. More than 14 per cent of all the boys who obtain their primary certificates pass on to the higher primary schools, and the number is steadily increasing. A considerable proportion of the girls also pass from the lower to the higher schools. All such schools, except in Paris, are open not only to the children in the town or commune which establishes them, but to the surrounding district, hence the necessity for many of them to be boarding schools. The fees for boarding houses range from £16 to £30 per annum, the majority being about £25. The subjects taught are grouped under four sections: general, industrial, commercial, and agricultural. The first year's course is the same for all pupils, no specialization being allowed till the second year. Six subjects are regarded as the basis of all instruction, and are therefore taught in all sections, viz. morals, handwriting, history, civics, gymnastics, and singing. These are taught one hour a week each, to all boys and girls throughout the school. The industrial section has more mathematics, technical drawing, and manual work (six hours a week) than the other sections. The commercial section has more book keeping (three hours a week) and modern languages (four hours a week). Manual work receives two hours a week, and an additional hour is given to commercial geography. The agricultural section has no modern languages and very little drawing, but specializes in the natural sciences and manual occupations which bear upon soil culture. Every school must have a workshop, and every pupil takes a course in both wood and iron. Travelling scholarships are given to those intending to follow a commercial or industrial course, which enable students to reside for a time in other countries, and take courses at commercial or other schools. The curriculum of these schools includes a resumé of the work done in the primary school (the subjects being dealt with more deeply), applied arithmetic,

the elements of practical algebraical and geometrical work, the rules of ordinary accounts and book keeping, elementary natural and physical science as applied to agriculture, manufacture, and hygiene, geometrical, model, and ornamental drawing, the elements of common law and political economy, elementary French history and literature, the principal epochs of general history, more especially those of modern times, industrial and commercial history, modern languages, working in wood and metal, for boys, needlework, cutting out, and dressmaking for girls, and any other subject which accords with the distinctive aim of such schools, and does not trespass on the distinctive work of the secondary schools.

Germany—Since the Reformation Germany has been distinguished by enlightened zeal in promoting public instruction. What Knox aimed at in Scotland, Luther originated in Germany. Both reformers held Christian education to be nationally indispensable, and endeavoured through common schools to increase the power and the happiness of their country. In his stirring address to the councilmen of all the towns of Germany calling on them to establish Christian schools Luther enunciated principles, some of which have only of late begun to be appreciated in Britain and the United States. He insisted on the maintenance not only of schools, but of school libraries, and suggested that half time system of which much has of late years been heard. The boldness, breadth, and minuteness of his educational opinions prepared Prussia and other states for the form which legislation subsequently assumed. Parental responsibility and national obligation were so constantly inculcated by Luther and other reformers, that ecclesiastical authority, ultimately sustained by public opinion, easily established a gently compulsory education. By the processes which were conducted the population was early ripened for that stringent legislation which has made Germany conspicuous among European nations. The interest in public instruction never flagged and when in 1701 monarchy was established in Prussia the government was sustained in vigorously promoting the spread of schools and in 1794 the obligation of parents to send their children to school became a fundamental law of the land. Although the early part of last century saw Germany overrun with French soldiers and national extinction imminent, no sooner was this danger averted than educational enthusiasm revived, various regulations and methods which had been diffused through the country in a fragmentary way were in 1819 harmonized by the well known statesman Von Altenstein and formed part of what is confessedly in many respects the completest system of national education yet instituted. Several changes and modifications have been adopted since 1819, but they have been in harmony with Von Altenstein's outline not in opposition to it. While there are some diversities in the laws and details of administration in the different states now united in the German Empire the general principles and arrangements are common to all.

Parents are compelled to send their children to school from 6 or 7 to 14 or 15 years of age. Every commune or parish (*Gemeinde*) however small must support, at its own cost, a primary school, for which the minimum range of instruction is defined. Every town must institute and maintain one or more 'burgher' schools (*Bürger schulen*), which supply a higher education, and above these are the gymnasia, the pro gymnasiums, the 'real' schools (*Real schulen*—see REAL SCHOOLS), upper burgher schools, and, crowning all, the universities. While every

German university is a state establishment, and belongs exclusively to the state—while the secondary schools belong to the province, and the primary schools to the department and the commune—they all, in reality constitute an organic whole influenced by one spirit, and kept constantly in healthful action. The minister of public instruction, the royal commission, the provincial consistory, and the school-board regulates the whole system from the universities to the lowest primary school. The minimum of instruction required in elementary schools was changed in 1854. It embraced (1) religious instruction morality based on the positive truths of Christianity (2) the German language, and in the provinces the vernacular tongue in addition to the German, (3) the elements of geometry, and the general principles of drawing, (4) calculation and applied arithmetic, (5) the elements of physics, geography, general history and the history of Germany, (6) singing, (7) writing, and (8) gymnastic exercises. To secure efficiency in teaching these branches the students in normal seminaries were carefully instructed, but it having been found that in their own schools they generally attempted more than the syllabus strictly required, new regulations have been enforced since 1854. In the higher institutions the course of instruction is varied, there is almost unflinching animation, and the period of attendance is so long that 19 is the average of leaving many of the *Realschulen*. The normal seminaries, which are established in every department, and supported partly by the state treasury and partly by the departmental school exchequers, give a three years course of training. Secondary schools are classified as follows—Classical schools (1) *Gymnasium* (nine years' course), (2) *Progymnasium* (six years course). Modern schools, in which Latin is taught (1) *Realgymnasium* (nine years' course), (2) *Realprogymnasium* (six years' course). Modern schools in which Latin is not taught *Oberrealschule* (nine years' course), (2) *Realschule* (six years course). The *Gymnasien* (classical schools) curriculum includes religion German and historical narration, Latin, Greek, French, history and geography arithmetic and algebra, natural history, physics elements of chemistry and mineralogy, writing and drawing. In the modern schools the subjects taught are religion, mother tongue French, English, history and geography, mathematics, natural history, natural science, writing and freehand drawing. These schools are greatly encouraged by the government, and are very popular among the middle classes. The passing of the examinations at the end of the respective courses confers certain privileges with respect to admission into institutions of higher education, the different departments of the civil service, and various callings and professions. In Saxony a law was passed in 1873 ordaining that 'all boys leaving the elementary school are hereby required to attend a continuation school for three years, unless their further instruction is provided for by some other approved means'. As the boys leave the elementary schools on completing their fourteenth year, this means that they are under compulsory education till their eighteenth year. These continuation schools may be held either on week days or Sundays. Not less than two hours per week must be given to the work. The subjects taught are German, arithmetic, history and geography, science, geometry, mensuration, and drawing, the first two being obligatory. In some cases religion (not dogmatic) and French are taught. The chief aim in the teaching is to make all the work in a subject directly relate to the different occupations of the students. In

1891 an imperial law on the regulation of industry was passed, which contained this clause 'The masters in any branch of industry are bound hereby, in the case of their workers under the age of 18 who attend an institution, recognized by the authorities of their district or their state as a continuation school, to allow them the time fixed as necessary for such institution by the authorities'. The purpose of the schools is threefold: to extend general culture, to train intelligence and impart greater knowledge, especially in relation to industrial and commercial life, and to form good citizens.

Switzerland—This country early recognized the national importance of a sound and general education. In the year 1603 the government of the canton of Aargau recommended that every commune should set up a public primary school, and soon after, this was made a compulsory duty. The school was to be open for twelve consecutive weeks at least, after the end of harvest time, and every child was bound to attend for three consecutive years. The canton of Bern, in 1675, ordered schools to be established in, and by, every parish, the funds for their support to be locally provided, and attendance to be compulsory. By 1798 no less than 500 such schools had been established in the canton for a population of 217,165. At the beginning of the nineteenth century the necessity of a good and generous system of primary education as the basis for the best national and local life was recognized throughout the country and most systematic and successful efforts have been continuously made to secure and maintain it. The supreme educational authority is the canton in each case and the local authority is the commune. The former makes certain grants towards the payment of teachers' salaries, school buildings and school materials. The amount of grant varies in the different cantons, and according to the necessitous condition of the commune. The average proportion, throughout the country, of the whole cost contributed by the cantons is about 31 per cent, leaving 69 per cent to be provided by the communes. The total average cost per pupil per year is slightly over £2 in primary schools. The schools are graded as follows: primary, higher primary, and higher. All these grades are found in each canton. The primary schools are managed by a school board of five members appointed by the communal council for four years (teachers and their near relatives being ineligible to serve on these boards). In the canton of Bern the higher primary or district schools are constituted by the combination of several communes, and each is managed by a commission consisting of at least five members chosen partly by the various communal councils concerned, and partly by the cantonal education department, which also nominates the president of the commission. The higher schools are generally cantonal schools, and each is managed by a commission of from five to eight members appointed wholly by the cantonal education department. The amount of money to be spent is always determined by the canton for each school. Universities, gymnasiums, real gymnasiums, higher commercial schools, higher real schools, general higher schools, and technical colleges are cantonal institutions aided by the federation or Bund. Commercial and technical schools are usually maintained by the locality (generally a town) in which they are situated, but these also receive some federal support. The federal grant is generally a lump sum paid to the individual local authorities from the department of industry and commerce, and allotted by the cantonal authorities. Such grants give the right of inspection, and some control over the curricula and

conditions of admission, in each school, to the cantonal authorities. The money for all public purposes is obtained by direct taxation, so that every individual citizen knows and feels his personal sacrifice for education. There are continuation schools for adults, which are largely used by men in preparation for the recruits examination. All grades of schools are most carefully and completely organized and co-ordinated and no public money is given for any educational institution until the highest educational opinion (expressed through the central authority) has shown in what way, and to what extent the different grades and institutions are to be aided, maintained, and organically connected with each other. According to the state law of Bern, 'No one may devote himself to giving private instruction or establish a private school without the authorization of the director of education, which will only be granted with the concurrence of the school inspector for the district'. The subjects taught in the primary schools include: language, writing, arithmetic, book-keeping (in the upper grade), geography, history (national and universal), singing, drawing, elements of geometry and mensuration (upper grade), natural science, gymnastics, constitutional law (upper grade), domestic economy, and needlework.

Denmark—Schools in Denmark were, previous to 1864, modelled on those of Germany. Since 1864 there has been a decidedly individual and strikingly successful development, chiefly remarkable for work done in the *Realskoler* (real schools) and *Folkhøjskoler* (people's high schools). Although the state contributes about £10,000 per year to elementary schools it claims no right to inspect the schools, except only with regard to the teaching of singing and gymnastics. The school authority in every parish is called the 'school commission', and consists of the clergyman, who is chairman *ex officio*, and two other persons elected by the parish council. These act as school inspectors, and advise the parish council as to the needs of the school, for which the council may vote funds. For each county council area there is also a 'school direction', whose chief duties are: to appoint teachers from a list drawn up by the parish council, to administer the county council school fund, which is drawn partly from state and partly from local sources, to provide pensions for teachers and their widows, and to provide for the increase of teachers' salaries according to length of service. The principal subjects taught in the elementary schools are: reading, writing, arithmetic, universal history, geography, elementary science, singing, and gymnastics. The children generally stay at school till they are 14 years of age. The supreme authority over them is the education office. Training colleges are provided for the training of teachers, and there are summer schools at which courses are given for the further training of teachers in elementary schools, real schools, and people's high schools. These courses occupy one, two, or three months, and are subsidized by the state. Bursaries and grants for purchasing books are also given. Continuation schools are held for those who have left the day schools. These are, as a rule, held in the elementary schools and taught by the school staff. The real schools and the Latin schools provide secondary education. Whilst the latter have increased about 50 per cent since 1880, the former have quadrupled in that time. Of the Latin schools recognized by the state, one half are in private hands, and of the real schools recognized by the state two thirds are in private hands. To obtain state recognition a private school must be visited by a state inspector, who must be satisfied

as to the teaching, qualifications of the teachers, and premises, and the school must accept a triennial inspection of this kind. When a school has obtained state recognition it receives grants according to the success of its pupils in the state examinations, a higher examination which admits to the universities, and a lower which is useful to those entering on commercial careers, and obligatory for those who wish to become dentists, veterinary surgeons, solicitors, surveyors, agricultural or horticultural students, &c. These examinations are partly written and partly oral, the latter being conducted by the teacher in the presence and under the direction of a state censor. The subjects for the higher examination (Artium) are Danish, Old Scandinavian, French, German, English, history, Latin, Greek, and physiography—for those who take the classical side—while others, instead of the last three of these, take arithmetic and algebra, geometry, mechanics, physics, and optics, and chemical physics with astronomy and meteorology. Both classical and non-classical students have to pass, at the end of their fourth year, an examination in Danish composition, German, French, Latin, history, geography, natural history, arithmetic and algebra, geometry, Greek (classical students only), and physiography (non-classical students only). For the lower examination (Præliminar) the subjects are Danish, English, German, French, history, geography, natural history, physiography, geometry, and arithmetic and algebra. The *Folkhøjskoler* (people's high schools) are boarding schools for adults. They are held in two sessions, one from November till March or April, and the other from May till July. The former is, as a rule, attended by men only, and the latter by women only. There are nearly seventy such schools. The students who attend are, for the most part, men and women between 18 and 25 years of age, who come from the poorest homes in the country. The aim in these schools is to give a liberal education. The subjects taught include Danish, universal history, geometry, physics, drawing, book-keeping, statistics, singing, English, geography, arithmetic, hygiene, gymnastics, religion. For technical education there are five agricultural and two horticultural schools conducted on similar lines to the *Folkhøjskoler*, as well as seven schools which combine the functions of high schools and agricultural schools. Bursaries which are sufficient to pay half the expenses are given to the poorer students by the county councils. It is claimed that the education given in them has so quickened and broadened the minds of the students that it has made possible the reformation and revolution which have transformed Denmark from an agricultural country on the verge of ruin to the most successful agricultural country in the world. The state contributes each year £10,000 for bursaries, and nearly £7000 directly to the schools for working expenses. For schools in some British colonies, &c., see continuation of article in SUPP.

BOOKS OF REFERENCE—Volumes of Special Reports issued by the Board of Education, the Educational Systems of Great Britain and Ireland, Graham Balfour, English National Education, H. Holman, History of the Burgh Schools of Scotland, James Grant, European Schools, L. R. Klemm, German Higher Schools, James E. Russell, Notes of American Schools and Colleges, J. G. Fitch.

SCHOONER, a name of certain types of two-masted, three-masted, and four-masted vessels. The merchant or trading schooner, also called the top-sail schooner, has two masts, the main-mast being fore and aft rigged and the fore-mast having a square top-sail, either single or double. The schooner

yacht is also two-masted, but she almost always has both masts fore and aft rigged. The three-masted trading schooner has all masts rigged with fore and aft sails, and the jackass schooner differs from it only in having square sails on the fore-mast. There are also swift fore and aft rigged four-masted schooners, chiefly American. Schooner yachts are now very rare.

SCHÖPENHAUER, ARTHUR, a German philosopher, born at Danzig, February 22, 1788. His father was a banker, and his mother, Johanna Schopenhauer, attained considerable distinction in the literary world as a writer of books of travels and novels. In his youth he passed a considerable portion of his time travelling with friends in France and England, by which means he acquired an extensive knowledge of the language and literature of both these countries. In 1809 he entered the University of Göttingen, where he studied philosophy under Gottlob Ernst Schulze, at whose recommendation he devoted himself to the almost exclusive study of Plato and Kant. In 1811 he proceeded to Berlin to hear Fichte, but was disappointed with the teaching of that philosopher. He graduated at Jena in 1813 with the essay on the Fourfold Root of the Principle of Sufficient Reason (*Ueber die vierfache Wurzel des Satzes von zureichenden Gründen*), in which he lays down the basis of his future system. The following winter he spent at Weimar in the society of Goethe, whose theory of colours he adopted. While here he was led to the study of Hindu antiquities through the influence of the orientalist Maier. From 1814 to 1818 he lived at Dresden, and occupied himself principally with the preparation of his most important work—*The World as Will and Idea* (*Die Welt als Wille und Vorstellung*, 1819, 8th edn., 1891). Previous to this he had published a work on optics (*Ueber das Sehen und die Farben*, Leipzig, 1816). In 1818 he travelled in Italy, visiting Rome and Naples, and on his return qualified himself as lecturer at Berlin. From 1822 to 1825 he was again in Italy, returning in the latter year to Berlin. Here as a private lecturer he met with little success, and in 1831 an outbreak of cholera caused him to leave that city. The rest of his life he spent at Frankfurt on the Main, and here he died on the 21st of September, 1860. His later works are *Die beiden Grundprobleme der Ethik* (1841), and *Parerga und Paralipomena* (1851). There are editions of his works by Steiner (12 vols. 1894–96) and others. See selections from his Letters, edited by Schemann (1893), Becker (1883), and others, also Schopenhauer's *Gespräche und Selbstgespräche* (1897).

The philosophical system of Schopenhauer has for its fundamental doctrine the proposition that the only essential reality in the universe is will. His conception of will, however, has a much wider significance than the common acceptance of the term implies. In it he includes not only conscious desire, but also unconscious instinct, and the forces which manifest themselves in inorganic nature. What are called appearances exist only in our subjective representations, and are merely forms under which one universal will manifests itself. Between this universal will and the individuals in which it appears there are a number of ideas, which are stages in the objectivization of the will. Throughout nature, from the lower animals downwards, the will works unconsciously, and it only attains consciousness in the higher stages of being, as man. All intelligence serves originally the will to live. In genius it is emancipated from this servile position, and gains the preponderance. Upon this foundation Schopenhauer rears his æsthetic and ethical structures, the former of which derives much from the Platonic system,

while the latter resembles in maintaining the necessity of entirely subduing the sensuous nature in man, without determining positively the true end of spiritual life, the Buddhist doctrine of Nirvana, or of the fortunate final state of saints purified by asceticism, and who have entered into the unconscious state. 'His ethical requirements are sympathy with the suffering, which is connected with all objectifications of the will to live, and, above all, the mortification in ourselves not of life, but rather of the will to live, through asceticism.' His chief works have been translated into English, and many of his smaller essays in the Schopenhauer series of T. B. Saunders (five vols., 1889-91). See works by Gwinner (1878), Zimmern (1876), Wallace (1890), Belfort Bax (Selected Essays of Schopenhauer, 1891), Ribot (6th edn., 1899), Kuno Fischer (1896), Volkelt (1900), &c.

SCHOREEL, JAN VAN, a distinguished Dutch painter, received his name from Schoreel, a village near Alkmaar, where he was born in 1495. His love of painting appeared in his boyish sports. He copied every painted window, and covered with delicate figures every horn inkstand that came in his way. At the age of fourteen years he was placed with the painter Willem Cornelis. At the age of seventeen he travelled to Amsterdam, and entered the establishment of Jakob Cornelis, one of the most celebrated painters and engravers on wood of that period. Here he spent several years. He next repaired to the first of the masters then living, John of Mabuse, in Utrecht. The disorderly life of his new master disgusted the young Schoreel, and he visited successively many large cities, where there were painters of eminence, especially Cologne and Spire, where he studied architecture and perspective. He also visited Dürer in Nuremberg, and was received kindly. At the age of twenty-two Schoreel passed through Carinthia to Venice. One of his countrymen in a monastery there persuaded him to undertake a pilgrimage with him to Palestine. For three years he remained within the walls of Jerusalem sketching views of the city and surrounding country. On his return he spent some time at Rhodes, which he painted, together with scenes from the surrounding country, and afterwards at Rome, among the works of Raphael, Michael Angelo, and Giulio, till Adrian VI., a native of Utrecht, ascended the Papal chair in 1522, and committed to him the superintendence of the Belvedere. The death of Adrian the following year induced Schoreel to return home, which he did by way of France. He now executed many splendid pieces in Utrecht, afterwards in Haarlem, and from time to time in other cities in the Netherlands. He died at Utrecht, December 6, 1569. He has been compared with Jan van Eyck, whom he equalled in splendour and truth of colouring, in expression, in warmth of representation, and, at the most, was inferior to him only in the execution of particular parts. Unhappily the rage of the fanatics in a subsequent age for destroying pictures was fatal to many of his most valuable works.

SCHORL. See **TOURMALINE**.

SCHREVELIUS, CORNELIUS, a learned critic, was born at Haarlem, about 1615. His father was rector of the school of Leyden, in which office he was succeeded by Cornelius in 1642. The latter had taken his degree in medicine, but it is not stated if he ever practised this profession, and he is only known by his literary labours. On his promotion to the rectorship of the Leyden school he turned his attention exclusively to classical pursuits. His name is now principally known by a *Manual Greek and Latin Dictionary* (1654), which has been often

reprinted in most countries of Europe. This work was very extensively used from its first publication till a comparatively recent date. It was very far, however, from being perfect, the list of Greek words was very defective, and false etymologies and incorrect renderings were of frequent occurrence. An edition, with great improvements by Fleury-Lécluse, appeared at Paris in 1820, and it was translated into English, with very extensive additions and improvements. Besides his *Lexicon Schrevelianum* executed a number of *variorum* editions of the classics, which are more remarkable, however, for the excellence of the paper and typography than for the taste and judgment displayed in the notes. Of these we may mention Juvenal (1648), Hesiod (1650), Terence (1651), Virgil (1652), Horace (1653), Homer (two vols. 1656), Martial (1656), Lucan (1658), Quintus Curtius (1658), Justin (1659), Cicero (two vols. 1661), Ovid (three vols. 1662), and Claudian (1665). He died in 1664.

SCHUBERT, FRANZ PETR, one of the greatest composers of modern times, born at Vienna, Jan 31, 1797, commenced his musical education under Michael Holzer in his seventh year, and in 1808, in consequence of his beautiful voice, was admitted among the chorists of the court chapel. He soon acquired particular proficiency on the piano and the different stringed instruments, so that in a short time he was able to take the part of first violin in the orchestra. He was instructed in the principles of harmony by the court organist Ruziczka, and in composition by Salieri. After he left the court chapel he supported himself by teaching music, and continued in private the prosecution of his musical studies, devoting himself particularly to original composition, in which he soon acquired a remarkable facility. He attempted all kinds of music, and proved both his industry and his powers of invention by operas, symphonies, choruses, overtures, cantatas, psalms, masses, *stabat mater*, hallelujahs, trios, rondos, vocal and string quartets, &c. He remained, however, for some time unappreciated, but when once he became known his fame was not confined to Germany, but extended to every country where musical knowledge has attained any degree of perfection. His ballads and songs, which are reckoned innumerable, are the works in which he most excelled. His greatest instrumental works are *The Rosamunde Entr'acte*, the *B Minor* (Unfinished) and *C Major* symphonies, the *A Minor*, *D Minor*, and *G string* quartets, pianoforte sonatas, the *String Quintet in C*, and the *Rondeau Brillant in B Minor*. He died at Vienna, Nov. 19, 1828. See *Grove's Dictionary*.

SCHULTENS, ALBRECHT, a celebrated orientalist, born at Groningen in 1686, studied theology and Arabic at that place, at Leyden, and Utrecht, became a preacher in 1711, professor of the oriental languages in 1713 at Franeker, and in 1729 professor of Hebrew and oriental languages at Leyden, a post which he filled with great distinction until his death in 1750. His chief works, *Origines Hebraicae et Institutiones ad Fundamenta Linguae Hebraicae* (1737), had an important influence on the study of the eastern languages. His son JOHANN JACOB (1716-78) was the author of several learned dissertations and treatises. HEINRICH ALBRECHT, son of the latter, born at Herborn in 1749, was educated at Leyden, where he studied Arabic and Hebrew, and afterwards became a commoner in Wadham College, Oxford, and received the degree of Master of Arts there. On his return to Holland he was chosen professor of the oriental languages at Amsterdam, where he resided until the death of his father, whom he afterwards succeeded at Leyden. He died in 1793. Besides his *Anthologia Sententiarum Arabicarum*

(1772), he published an edition of Pilpay's Fables, and a supplement to the *Bibliothèque Orientale* of D'Herbelot.

SCHUMANN, ROBERT, celebrated composer, was born on June 8, 1810, at Zwickau, where his father was a bookseller. At the age of ten he entered the gymnasium of his native town, and in 1828 he matriculated, much against his will, as a law student at the University of Leipzig. In 1829–30 he continued his desultory studies in jurisprudence at Heidelberg, but in the latter year he began the systematic study of the pianoforte under Friedrich Wieck at Leipzig. The use of a mechanical contrivance, invented by himself, for securing a more perfect command of technique, permanently injured the third finger of his right hand, and he was thus compelled to abandon all hope of becoming a great pianist and to devote himself instead to the study of composition. In this his teacher was Heinrich Dorn. In 1834 he joined with several kindred spirits in producing a new musical paper, the *Neue Zeitschrift für Musik*, of which he was at first joint, and afterwards till 1841, sole editor. This paper inaugurated a new school of musical criticism, and through it Schumann exercised a powerful influence on the musical development of Germany and the neighbouring countries. In 1835 Mendelssohn came to Leipzig, and a warm friendship soon arose between the two composers. During the next few years Schumann composed his finest works for the pianoforte. In 1840, after much trouble caused by her father's opposition, he married Clara Wieck, the daughter of his Leipzig teacher, afterwards famous as one of the greatest of pianists. To this period belong the many exquisite songs that form such a notable part of his artistic work. In 1841 he composed three symphonies, including the B^b and the D minor, and in 1842 he turned his attention to chamber music, the chief results being three fine string quartets and the popular quintet for pianoforte and strings. The following year witnessed the production of his variations for two pianos and his choral work, *Paradies und die Peri*, based on Moore's *Lalla Rookh*. In 1843 he was appointed professor of pianoforte playing and composition in the newly founded conservatorium at Leipzig, but his intense reserve and his peculiarly high strung temperament made him unfit for such a post and he soon resigned it. A symphony in C major was completed in 1846 and four years afterwards his only opera, *Genoveva*, was performed with but small success. In 1849 his music to Goethe's *Faust*, begun several years before and not completed till later, was first performed and in 1852 his incidental music to Byron's *Manfred* was written. In 1850 he accepted the post of conductor in Düsseldorf, but he proved ill adapted for such work, and in 1853, after some ill feeling and painful friction, he was replaced. His B^b symphony, known as 'Rhenish', belongs to this part of his career. Signs of mental collapse now began to show themselves, and in February, 1854, he threw himself into the Rhine. He was saved by some boatmen, only to pass the remainder of his days in a private asylum near Bonn, where he died on July 29, 1856. Schumann was one of the foremost champions and representatives of the romantic school in music but in many respects he stands quite apart from its other representatives. In the purely lyric, represented by his numerous songs and similar works he is unsurpassed. There are *Lives* by Wasielewski (1858, 3rd ed., 1880), Spitta (1883), Eiler (1887), and Niecks (in English, 1898). A selection from his *Jugendbriefe* was edited by his wife in 1885 (Eng. trans., 1889), and another series of his letters appeared in 1886 (Eng. trans., 1890).

SCHUYLKILL, a river of Pennsylvania, which rises in the north side of the Blue Mountains, runs south east, and unites with the Delaware at Philadelphia, after a course of 125 miles.

SCHWABACH, a town of Bavaria, in Middle Franconia, on a stream of the same name, 10 miles south west of Nurnberg. It is well built, and has four churches (one of them a fine edifice of 1469–95), a synagogue, town house, lunatic asylum, house of correction, a progymnasium, a normal college, and other educational institutions, and extensive manufactures, chiefly of needles, soap, beer, and articles in gold, silver, and wire. It owed its early prosperity to refugees driven from France by the revocation of the Edict of Nantes. Pop. (1895), 8404.

SCHWABENSPIEGEL (that is, *Mirror of the Swabians*) a collection of legal precepts and customs in Upper Germany, made probably between 1268 and 1282 by an unknown monk. It never acquired the same authority as the *Sachsenspiegel*. It went out of use in the fifteenth and sixteenth centuries.

SCHWABISCH HALL, or HALI, a town of Wurtemberg, beautifully situated in the deep valley of the Kocher, 35 miles north east of Stuttgart. It is an old town, with one or two good churches, a handsome town house, library and the ruins of an old castle. From the thirteenth century till 1802 Hall was a free imperial city, but in the latter year it was attached to the Kingdom of Wurtemberg. Pop. (1895) 9173.

SCHWANTHALER, LUDWIG VON, a distinguished German sculptor was born on Aug. 26, 1802, at Munich, where his father, also a sculptor, died in 1820. He left the gymnasium in 1818 to devote himself wholly to art, and wrought in his father's workshop, at the same time attending the Academy. On the death of his father he carried on the business. His first important order was received in 1824, when King Maximilian employed him to supply relieves to encircle a silver table service. After a short residence in Rome, in 1826 he returned to Munich and opened a workshop of his own, and prepared two relieves for the Glyptothek, representing Achilles fighting in the Scamander, and the fight near the Ships a statue of Shakspeare for the theatre, and a Bacchus *froncz* for the palace of Duke Maximilian in Munich. In 1832 he again visited Rome, in order to prepare models for the subjects confided to him for the southern pediment of the Walhalla. In 1835 Schwantaler was made professor in the Academy in Munich, but after a time his labours were interrupted for some years by violent attacks of gout. Among the more important of his works may be specified fifteen colossal statues for the principal pediment of the Walhalla, models of the fifteen figures of the Battle of Arminius, for the northern pediment of the Walhalla, the great bas relief frieze, more than 250 feet long, in the Barbarossa Hall, the model, 70 feet high, for the colossal statue of Bavaria, a marble statue of the Emperor Rudolf for the cathedral in Spire, a statue of Mozart for Salzburg, a marble group of Ceres and Prosperine for Berlin, and designs for sculptors and painters. He died on 15th November, 1848.

SCHWARZ, BERTHOLD, born in the first half of the fourteenth century, was a Franciscan friar of Friburg, or, according to some, a monk of Cologne, and has been regarded as the inventor of gunpowder and firearms. He is said to have been mixing together the ingredients of gunpowder—namely, nitre, sulphur, and charcoal—in an iron mortar, in the prosecution of some alchemical researches, when the composition exploded, from an accidental spark occasioned by the collision of the pestle and mortar. The former being driven forcibly to a distance,

Berthold thence conceived the idea of forming pieces of artillery. Such is the story commonly told of the invention of gunpowder, said to have occurred in the early part of the fourteenth century. There is, however, much discrepancy in the accounts of this discovery, and it is certain that Roger Bacon, who died in 1292, was acquainted with an inflammable composition similar to gunpowder, the knowledge of which Europeans appear to have derived from the Orientals. It appears, however, to be a fact that Schwarz, if not the inventor of gunpowder, was at least the inventor of field artillery. In 1380 he came to Venice, and was commissioned by the government to cast some cannons, which are described as of an enormous size. The price agreed upon for his work not being forthcoming he became importunate, and he was rewarded by being cast into prison, where it is believed he died in 1384. See GUNPOWDER.

SCHWARZ, CHRISTIAN FRIEDRICH, a celebrated Protestant missionary, born in 1726 at Sonnenburg, in Brandenburg, was educated in his native town and at Kustrin till 1747, when he proceeded to the University of Halle. He was intended for the church, and having been proposed as a missionary for India, for which he had become particularly qualified by his previous acquisition of the Tamil language, he at once embraced the proposal, and in 1750 sailed from London for Tranquebar, the seat of a Danish mission. Here he continued to labour till 1766, when his services were accepted by the Society for Promoting Christian Knowledge. He now removed to Trichinopoly, where he founded a church and school. While residing at Trichinopoly he made frequent visits to Tanjore, where he became a favourite of the Rajah of the Tula Maha, who allowed him to erect a church at Tanjore. On applying to the Presidency of Madras for assistance to carry on this work he was requested by the government, on the suggestion of Hyder Ali himself, to act as their ambassador in negotiating with him for a continuance of the peace, and executed the commission with success, though war shortly after broke out, and as Schwarz thought, not without blame on the part of the British. During the course of the war, when Tanjore was threatened with destruction by famine, both from the number of persons who had taken refuge in it and from the refusal of the peasants to send in supplies, because they were afraid of not being paid for them, Schwarz's aid was effectually interposed, and the peasants at once accepted his promise as a better guarantee for payment than any formal document which could have been offered them from any other quarter. In 1787, when the Rajah of Tanjore was on his death bed, he intrusted his minor son and successor to the guardianship of Schwarz, who not only accepted the office, but discharged it so faithfully and effectually that his pupil was thoroughly educated, and possessed a familiar acquaintance with the most distinguished names in European science and literature. At first the slow progress which Schwarz made in the conversion of the Hindus was very discouraging, but ultimately, as much by his exemplary conduct as by the influence of his preaching, the barrier of opposition gave way, and in the latter years of his life he had the satisfaction of counting numerous congregations of converts both in towns and villages. The account of his labours cannot be better summed up than by Bishop Heber — 'He was one of the most active and fearless, as he was one of the most successful missionaries who have appeared since the days of the apostles.' He died in 1798. Two monuments have been erected to his memory, one by his grateful pupil the Rajah of Tanjore, executed by Flaxman, and

placed in the mission church of that city, and the other, executed by Bacon at the expense of the East India directors, and placed in the Church of St. Mary at Madras.

SCHWARZBURG-RUDOLSTADT, a German principality, consists of several isolated portions, situated between the territories of Prussian Saxony, the Saxon duchies, and the principality of Reuss. It lies on the northern side of the Thuringian Forest, and has an area of 862 square miles. The surface is rugged, and the soil by no means fertile, for although it is generally cultivated with the greatest care, the corn produced falls far short of the annual consumption. Perhaps the most important crop is flax, the culture of which is almost universal. A great part of the land is devoted to pasture, and great numbers of cattle are reared. The minerals include lead, iron, and salt, all of which are worked to a considerable extent. The principal manufactures are, woollen stuffs, ironware, glass, and porcelain. The chief export, in addition to the minerals and manufactures, is wood. The inhabitants are almost all Lutherans, there being only 479 Roman Catholics and 81 Jews. The government is a hereditary and constitutional monarchy, with a diet consisting of sixteen members, of whom twelve are chosen by general election. It has one vote in the federal council, and one in the diet. For administrative purposes it is divided into an upper and a lower lordship, or the three Landratsämter, Rudolstadt, Königsee, and Frankenhausen, subdivided into the seven Amtsgerichtsbezirke, Rudolstadt (the capital), Stadtilm, Königsee, Oberweissbach, Leutenberg, Frankenhausen, and Schlotheim. Pop (1895), 88,685, (1900), 93,059.

SCHWARZBURG-SONDRERSHAUSEN, a German principality on the northern side of the Thuringian Forest, between the territories of Prussian Saxony and the Saxon duchies, and consisting of several distinct portions, area, 332 square miles. It is more fertile than Schwarzburg-Rudolstadt, producing corn, which, after satisfying the home consumption, leaves a small surplus for export. One of the principal sources of revenue is derived from the forests, which furnish excellent timber. Flax also is extensively cultivated, and great numbers of cattle, sheep, and swine are reared. The minerals include iron, alum schist, and copper. The first supplies several smelting furnaces and forges, and from the two last much alum and vitriol are made. After these, the only manufacture of any importance is porcelain. The principal exports are corn, wool, wood, ironware, iron, alum, vitriol, lampblack, rosin, and fat cattle. The government is a constitutional and hereditary monarchy, with a diet of fifteen members, five of whom are elected by the prince. As a member of the Germanic Empire, Schwarzburg-Sondershausen sends one member to the Bundesrath, and one to the Reichstag. For administrative purposes it is divided into an upper and a lower lordship, or into the three Landratsämter, Sondershausen, Arnstadt, and Gehren, subdivided into the seven Amtsgerichtsbezirke, Sondershausen (the capital), Klingen, Greussen, Ebelben, Keula, Arnstadt, and Gehren. The inhabitants are almost all Lutherans. Pop (1895) 78,074, (1900), 80,898.

SCHWARZENBERG, ADAM, COUNT OF, born in 1587, was descended from one of the oldest families of Franconia, and one which has numbered more than one distinguished member. He was prime minister to the Elector of Brandenburg, was all-powerful during the 'Thirty Years' war, and caused great calamities to the electorate of Brandenburg through his promoting an alliance with Austria against the Swedish Protestant League. When the 'great elector' assumed the reins of government he

punished Schwarzenberg by divesting him of his power and imprisoning him in the fortress of Spandau, where he died of apoplexy, March 17, 1641.

SCHWARZENBERG, CHARLES PHILIP, PRINCE OF, Austrian field marshal, born at Vienna in 1771, served in the early wars of the French revolution, in which he distinguished himself on several occasions. In 1805 he was at the head of a division under General Mack, and at Ulm commanded the right wing of the Austrian forces. After the fortune of the day was decided he forced his way through the enemy at the head of a body of cavalry. The battle of Austerlitz, at which he was present, was fought against his advice before Bennigsen and the Arch duke Charles had come up. In 1808 Schwarzenberg was ambassador to the Russian court, and in 1809 commanded the rear guard after the battle of Wagram. In the campaign of 1812 he commanded the Austrian auxiliary corps of 30,000 men in Galicia—which, however, remained almost entirely inactive—and at the close of the year he received the staff of field marshal general. In 1813 he was appointed to command the army of observation in Bohemia, and after the declaration of war by Austria Prince Schwarzenberg was named generalissimo of the allied forces. After Napoleon's return from Elba he commanded the allied forces on the Upper Rhine, but the contest was decided at Waterloo without his participation. The prince died in 1820. Many of his military dispositions have been censured, and Napoleon declared that he could not command 6000 men.—See Prokesch, *Memoirs of Prince Schwarzenberg* (in German, Vienna, 1823).

SCHWARZENBERG, PRINCE FELIX LUDW. JOH. FRIEDR., an Austrian statesman, born 2d October, 1800, in the lordship of Krumau, in Bohemia, was the second son of Prince Joseph Schwarzenberg, who died in 1833, entered in 1818, as cadet, a regiment of hussars, advanced to be captain, and in 1824 went to St. Petersburg as an attaché to the embassy. Two years afterwards he was sent to London with despatches, and joined the extraordinary mission to Brazil in 1827 under Baron Neumann. Returning to Europe he was employed in connection with the Austrian embassies at Paris and Berlin, and in 1838 was appointed as envoy himself to the courts of Turin and Parma, a position which he exchanged in 1846 for a similar one at the court of Naples. Returning to Vienna from Naples in 1848 he re-entered the army with the rank of major general, and obtained command of a brigade under Nugent in Upper Italy, where he distinguished himself at the battles of Curatone and Goto, and before the decisive battle at Custozza was fought he had been promoted to be lieutenant field marshal. The crisis in the internal affairs of Austria called him back from the camp to the state office. After the suppression of the popular rising in Vienna in October, 1848, he was called to be the head of the new government, in whose operations his restless activity and energy were soon felt. The history of Austria at this period is very much the personal history of Schwarzenberg. The great object and tendency of his active statesmanship was to govern Austria as a unity in a military and absolute manner—still not without some inclination to internal reforms, to establish the preponderance of the Austrian power in Germany and Central Europe, and, in opposition to the system of isolation and federalism promoted by Metternich, to approach closer to Germany. He died in the midst of his activity, April 5, 1852.

SCHWARZWALD See **BLACK FOREST**.

SCHWEDT, a town in Prussia, on the left bank of the Oder, 24 miles south west of Stettin. It consists of well built houses and spacious streets, partially

lined with chestnut trees, and has three Protestant churches, a R. Catholic church, a synagogue, and a castle of the seventeenth and eighteenth centuries, with a park, a gymnasium, &c. It has manufactures of tobacco and cigars. Pop (1895), 10,114.

SCHWEIDNITZ, a town of Prussia, in Silesia, on the Weistritz, in a fertile valley, 29 miles south-west of Breslau. It is well built, consisting of good houses arranged in two spacious squares, and several well formed streets and has several churches, orphan asylum, a gymnasium, theatre, &c. Fine pleasure-grounds have taken the place of its former fortifications. Its manufactures are very varied, and among its industries brewing has long been noteworthy. It has a large trade in grain and other agricultural produce, and much flax, fruit, and sugar beet are grown in the neighbourhood. Schweidnitz was made a regular fortress by Frederick the Great, and figured much during his wars. In 1807 it was taken by the French, and its outworks were dismantled. Pop (1885), 23,669, (1895), 26,130, (1900), 28,432.

SCHWEINFURT (ancient *Traiectus Suevorum*), a town of Bavaria, situated on the right bank of the Main, which is here crossed by several bridges, 24 miles N. N. E. of Würzburg. It is a place of considerable antiquity, having long been a free imperial city. Portions of the fortifications constructed by Gustavus Adolphus still remain. Among its buildings and establishments are a Roman Catholic and two Protestant churches, a handsome town house, a gymnasium founded by Gustavus Adolphus, a real school, &c. The manufactures are varied, and one of the most important is that of colours (Schweinfurt green, white lead, ultramarine). The trade, carried on partly by the river, is extensive, and there are large cattle and sheep fairs. Pop (1900), 15,295.

SCHWERIN, the capital of Mecklenburg-Schwerin, beautifully situated between the western shore of the lake of same name and other smaller lakes, 60 miles east of Hamburg. It is well built, containing four chief public squares, besides five others, and a great number of well paved streets. It consists of the Old Town and a number of other quarters, and contains four Protestant churches, of which the cathedral is a colossal structure in the Gothic style, consecrated in 1248 (tower added in 1891). The grand ducal palace is a fine edifice in the renaissance style, on an island between the lake of Schwerin and another lake, built in 1845-58. Other edifices are the new government buildings (1892), post office (1897), the theatre, museum, gymnasium, real-gymnasium, town house, &c. The manufactures include iron founding, machinery, carriages, colours, musical instruments, &c. Pop (1900), 38,662.

SCHWYZ, a central canton of Switzerland, from which the whole country is supposed to derive its name, bounded on the north by the cantons of Zurich and St. Gall, from which it is partly separated by Lake Zurich, west by Zug and Luzern, south by Lake Luzern, separating it from Unterwalden and Uri, and east by Glarus, area, 353 square miles. It belongs to the so called mountain cantons, being traversed in all directions by lofty chains and minor ramifications. Near the centre is the Mythen, 6315 feet above sea level, in the west the Rigi, 5905 feet, in the north the Rossberg, 5195 feet, and the Rhone, 4026 feet, in the south east the Pfanne, 2810 feet, and in the south the Drusberg, 7412 feet. The whole canton belongs to the basin of the Rhine, more than two thirds of the surface being drained by the Sihl and the Lake of Zurich, a third by the Lake of Luzern, chiefly by means of the Muotta, and the remainder, forming only an unimportant portion, by the Lake of Zug. Valleys of considerable extent are interposed between the mountain chains,

but generally at such a height as makes their culture by the plough impracticable, and hence the chief source of wealth is in the pastures, on which vast numbers of the finest cattle which Switzerland produces are grazed. In the lowest grounds the culture of the vine has been attempted, and wine of tolerable quality is produced on the southern shores of the Lake of Zurich. The canton is very poor in minerals. Cotton silk, earthenware, &c., are manufactured, and there is a trade in cattle and dairy produce. Schwyz being the most important of the cantons which first threw off the yoke of Austria, has had the honour of giving the name to the whole confederation. Its present government is an extreme democracy, the whole power, legislative and executive, being not only virtually but actually lodged in the male population of legal age, who exercise it by holding a general assembly every two years, and appointing to all public offices of any importance. The great body of the inhabitants are Roman Catholics. Pop (1900), 55,497.

SCIACCA, a town of Sicily, in the province of Girgenti, on the south-west coast of the island, 35 miles W. N. W. of Girgenti, on the slope of a steep hill. It is badly built, and among its chief buildings are the cathedral (eleventh century), some old castles, a gymnasium, a technical school, &c. The manufactures comprise earthenware and saltpetre, and there is a small shipyard. The sardine fishery and the trade in cereals, oil, sardines, &c. are also of some importance. In the neighbourhood there are warm springs, anciently known as *Therma Salinaria*. Pop (1881), 22,195.

SCIÆNA, a genus of Teleostean fishes, belonging to the section Acanthopteri, and forming the type of a family. This genus is allied to the Perches, but differs in having no teeth on the vomer or palatine bones. There is a single row of strong distinctly separated teeth in each jaw, with a few smaller ones among those of the lower jaw, and a row of smaller ones behind those of the upper jaw. The most important species of the genus is the *S. aquila*, the *maigre* of the French (see fig. at ICHTHYOLOGY), whose chief habitat is the Mediterranean, though it has also been caught on the British shores. It is from 3 to 6 feet in length, of a uniform grayish-silver colour, slightly inclining to brown on the back and lightest on the belly; the fins are reddish brown, the eye is placed high up on the head. The swimming bladder is peculiar, being fringed all round the edge. This fish is considered very good eating. It is remarkable for being able to make a kind of grunting or purring noise.

SCIATICA, a term used in medicine to denote a neuralgic affection, in which the pain stretches along the course of the great sciatic nerve, that is, from the hip along the back part of the thigh towards the ham of the leg. There is stiffness and pain, the latter often excruciating and occurring in paroxysms, and increased by any change of temperature and moisture; there is generally swelling of the limb at the commencement of the disease, but after repeated attacks the limb seems to shrink, owing to the wasting of the muscles. In some cases the articulation of the hip seems affected, and permanent immobility of the limb takes place. With regard to treatment, if sciatica manifests itself, which it commonly does, as a severe form of neuralgia, it is treated in the same manner as that disease; if, on the other hand, it is a complication of gout, rheumatism, &c., the treatment must have reference to the primary disease.

SCIENCE AND ART EDUCATION. In 1835 a select committee of the House of Commons was appointed 'to inquire into the best means of extending a knowledge of the arts and of the principles of

design among the people (especially the manufacturing population) of the country'. Its report, issued in 1836, recommended the establishment of schools of design, and accordingly, in 1837, a Council of the Government School of Design was constituted. The school was opened in Somerset House on June 1, 1837, and in 1841 steps were taken to encourage the formation of similar schools in the manufacturing districts. An inquiry conducted by a select committee of the House of Commons in 1849 led to a reorganization, under which the council was replaced in 1852 by a Department of Practical Art, with Mr (afterwards Sir Henry) Cole as general superintendent and Mr Redgrave as art adviser. In 1853 the Department of Science and Art came into being, and on the constitution of the Education Department in 1856, the former, which had hitherto been under the Board of Trade, was amalgamated with it. The head quarters of the department were removed in 1852 to Marlborough House, and in 1857 to South Kensington, where they have ever since been located. The Department of Science and Art was incorporated by royal charter on April 30, 1864. On April 1, 1900, the Education Department, including the Department of Science and Art, was replaced by the Board of Education. A brief summary of the work and institutions connected with science and art may now be given. Fuller details are to be found in the annually published Directory, Report of the Board of Education, &c.

The annual parliamentary grant for instruction in science and art is applied (a) to the direction and maintenance of the Royal Colleges of Science and Art and the science and art museums in London, and of the Geological Museum in Jermyn Street, London, and (b) to aid in the establishment and maintenance of science and art schools and classes, and of local museums of science and art. The aid is granted in the form of (1) maintenance and instruction of teachers and students attending the Royal Colleges of Science and Art, London, and other approved centres, (2) loans and grants to local museums and to science and art schools, (3) payments to the managers of science and art schools and classes, and in the form of certificates, prizes, medals, free studentships, scholarships, and exhibitions. Grants are intended to supplement and not to supersede local effort. Every school or class must be under the superintendence of a body of managers responsible to the board. It must not be conducted for private profit or farmed out to the teacher, and it must have local support either in the form of fees and subscriptions or of rates levied under the Technical Instruction Act. In counties and county boroughs in England and Wales which possess an organization for the promotion of secondary education, such organization, if recognized by the board, may notify its willingness to be responsible for science and art instruction within its area, and where no such organization exists the managers may be the county council or county borough council, or a committee thereof, acting under the technical instruction acts, or the governing body of a school (not being a public elementary school) under the endowed schools acts, or a committee formed (1) for the special purpose of superintending and managing a school or class to be aided by grants from the board, or (2) for conducting examinations of classes not aided by grants from the board.

The science subjects in which examinations are held under the authority of the board are arranged in six groups, for each of which there is a board of examiners with a chairman. The groups and subjects, with their numbers, are as follows.—Group I, Pure and Applied Mathematics, comprising 5,

mathematics, 6, theoretical mechanics (two divisions, solids and fluids), 20, navigation, and 21, astronomy (two divisions, spherical and nautical astronomy) Group II, Engineering, comprising 1, practical plane and solid geometry, 2, machine construction and drawing, 3, building construction, 4, naval architecture, 7, applied mechanics, 22, steam, and 5p, practical mathematics Group III, Physics, comprising 8, sound, light, and heat, and 9, magnetism and electricity Group IV, Chemistry and Metallurgy, comprising 10, theoretical inorganic chemistry, 10p, practical inorganic chemistry, 11, theoretical organic chemistry, 11p, practical organic chemistry, 19, theoretical metallurgy, and 19p, practical metallurgy Group V, Geology, Mining, and Physiography, comprising 12, geology, 13, mineralogy, 18, principles of mining, and 23, physiography Group VI, Biology, Physiology, and Hygiene, comprising 14, human physiology, 15, general biology, 16, zoology, 17, botany, and 25, hygiene Subject 24, agricultural science and rural economy, stands apart from all the above groups In most of the subjects there are three stages, elementary (or first), advanced (or second), and honours (in two parts), the most notable exception being mathematics, which consists of seven stages in two divisions, each division having an additional honours stage in two parts In the advanced stage and in part 2 of honours there are two grades of success, first and second class, but in section 1 of the elementary stage of general biology, physiography, and hygiene, and in honours when it is not divided into parts, there is only one grade of success, namely, pass Success in part 1 of honours in any subject is essential to qualify for examination in part 2 The art subjects in which examinations are held are the following—1, linear drawing by aid of instruments, 2, freehand outline drawing of rigid forms from flat examples, 3, freehand outline drawing from the round, 4, shading from flat examples, 5, shading from the round or solid forms, 6, drawing the human figure or animal forms from flat examples, 7, drawing flowers, foliage, and objects of natural history from flat examples, 8, drawing the human figure or animal forms from the round or from nature, 9, anatomical studies of the human figure or of animal forms, 10, drawing flowers, foliage, landscape details, and objects of natural history from nature, 11, painting ornament from flat examples, 12, painting ornament from the cast, &c, 13, painting from flat examples—flowers, still life, &c, 14, painting direct from nature, 15, painting (from nature) groups of still life, flowers, &c, as compositions of colour, 16, painting the human figure or animals in monochrome from casts, 17, painting the human figure or animals in colour, 18, modelling ornament, 19, modelling the human figure or animals, 20, modelling fruits, flowers, foliage, and objects of natural history from nature, 21, time sketches in clay of the human figure or animals from nature, 22, elementary design, and 23, drawings from actual measurements of structures, machines, &c, applied designs, technical or miscellaneous studies Besides these there are geometrical drawing, perspective, drawing on the blackboard, freehand drawing in outline, model drawing, drawing in light and shade from a cast, memory drawing of plant form, and drawing from life In some art subjects there are three grades of success—first class, second class, and excellent

An important part of the work of the board is the superintendence and inspection of schools of science, formerly called organized science schools A school of science is one in which the instruction is carried on methodically according to one or other of the courses laid down in the board's regulations.

The ordinary elementary course for such a school must include mathematics (stage 1), elementary physics and mechanics (theoretical and practical), elementary chemistry (theoretical and practical), elementary art and elementary practical geometry, but a somewhat different course is laid down for rural schools An advanced physical course must comprise mathematics (stages 2-4), practical plane and solid geometry (advanced stage), sound, light, heat, or magnetism and electricity (advanced stage, with practical work), and advanced inorganic chemistry (theoretical and practical), and there are also advanced mechanical and biological courses, besides special courses for girls Schools of science must have properly equipped laboratories, and a sufficient amount of literary or commercial instruction is insisted on Manual instruction is also required by the board To such schools the board pays an attendance grant of 30s per 100 attendances on all students who attend the full course and make at least 250 attendances during the school year, a variable grant of not more than 35s per student, determined in accordance with the inspector's report, grants for practical work, besides certain special grants Students in the elementary courses of such schools do not sit the regular evening examinations, but those doing advanced and honours work have the grants for them thus determined

The personal examinations are held by the board in the evenings in April and May, and in the day time in June Where numerous examinations have to be held, or where a large school has to be examined, a special local secretary is appointed by the board on the nomination of the managers, or of a special committee composed of delegates from several bodies of managers Teachers possessing the requisite qualifications can earn grants on the results of the examinations The rewards to students consist of certificates, prizes, medals, and scholarships Each candidate obtaining a success at any of the examinations receives a certificate A small number of king's prizes of books, instruments, &c, are given to those who do best at the examinations in the advanced stage of each science subject, or in the second or any higher stage of mathematics, and to those who do best in the personal examinations in art Bronze medals are given to all candidates who pass first class in part 2 of an honours stage, and to those who pass in an honours stage which is not divided into parts Seven Royal Exhibitions of £50 per annum, with free instruction for three years at the Royal College of Science in London or Dublin, twenty-two National Scholarships of 25s per week, with free instruction for three years at either of the royal colleges of science, six Free Studentships, entitling to free instruction for three years at the Royal College of Science, London, ten two year Royal Exhibitions in art, six two year National Scholarships in art, and fifteen Free Studentships at the Royal College of Art are awarded each year in accordance with the results of the regular science and art examinations Twenty local scholarships tenable for three years at a school of art under the board are also awarded each year The Whitworth Scholarships, founded in 1868 by Sir Joseph Whitworth, are also worthy of mention Under the present regulations, which came into force in 1887, thirty exhibitions tenable for one year and four scholarships tenable for three years are awarded each year The exhibitions are of the annual value of £50, and the scholarships of the annual value of £125 In 1898 science and art education in Scotland was placed under the supervision and control of the Scotch Education Department

Royal College of Science, London.—In 1851 a

Government School of Mines and of Science was opened in connection with the Museum of Practical Geology, but little more than a year later the name was changed to Metropolitan School of Science applied to Mining and the Arts, and the course of instruction enlarged. The Royal College of Chemistry, founded in 1845, was acquired for the nation in 1853 and added to the metropolitan school, which reverted in 1859 to its first title of Government School of Mines. In 1872 the school was removed from Jermyn Street to South Kensington. In 1881 it was reorganized and renamed Normal School of Science and Royal School of Mines, and in 1890 it was given its present name. Thus the Royal School of Mines is incorporated with the Royal College of Science, and students entering for the associateship of the school of mines receive their general scientific training in the Royal College of Science. The college has a dean and professors of mechanics and mathematics, physics, astronomical physics, chemistry, zoology, botany, geology, metallurgy, and mining, and there are also assistant professors, instructors, demonstrators, and laboratory assistants, a clerk and librarian, &c. It is primarily intended for the instruction of teachers and of students of the industrial classes selected by competition in the examinations of the Board of Education, but other students are admitted so far as there may be accommodation. The associateship of the Royal College of Science (A.R.C.S.) is granted in one or more of the divisions mechanics, physics, chemistry, biology, and geology, and the associateship of the Royal School of Mines (A.R.S.M.) in metallurgy or mining. The first year's course is the same for all sections, but the second and third years are devoted to the special branches selected by the students. Summer courses are provided for a limited number of science teachers.

Royal College of Art—The School of Design and Central School of Art opened in 1837 at Somerset House was removed to Marlborough House in 1853 and renamed the National Training School of Art. In 1896 the name was again altered, and since that date the institution has been known as the Royal College of Art. It was transferred to South Kensington in 1856. There are professors of painting, architecture, sculpture and modelling, and design, besides teachers for etching, stained glass, tile painting, stone and marble cutting, tapestry, illuminating, &c. The college is intended for the training of art masters and mistresses, and for the instruction of students in drawing, painting, &c. The number of fee-paying students is limited to about 150. The associateship (A.R.C.A.) is granted to students who pass successfully through a sufficient course in the college.

Royal College of Science, Dublin—In 1847 a Museum of Irish Industry and Government School of Science applied to Mining and the Arts was founded in Dublin under the authority of the Office of Woods and Forests, and in 1853 it was transferred to the newly established Department of Science and Art. After a thorough reorganization in accordance with the report of a committee of inquiry the museum was opened in 1867 under the new name of Royal College of Science, Dublin. The college has professors of descriptive geometry and engineering, applied mathematics, botany, chemistry, physics, zoology, and geology and mineralogy, besides a director, secretary, &c. The Department of Agriculture and Technical Instruction, which was created by an act of 1899, is responsible for the administration of the college, and also of the museum of science and art, the national library, the metropolitan school of art, and the royal botanic gardens. Several of

these were formerly under the Royal Dublin Society, which was founded in 1731 and incorporated in 1749.

Victoria and Albert Museum—The art collections in this museum originated in purchases of models, casts, prints, and other similar articles made for the former schools of design from 1837. In 1851 £5000 was spent in the purchase of art objects from the Great Exhibition, and these along with other articles constituted the contents of the Museum of Ornamental Art which was opened in September, 1852. By means of an annual parliamentary vote considerable additions to the museum were made from time to time, and in 1857 it was removed from Marlborough House to South Kensington. The buildings have been extended at various times but much yet remains to be done in this direction. The valuable Sheepshanks bequest of pictures and drawings was acquired in 1857, and with them a gallery of British art was begun. The Indian Section, formerly called the Indian Museum, was transferred to the Science and Art Department by the India Office in 1879. The National Art Library of 90,000 volumes has grown up along with the museum from the beginning, and has been contained in a special building since 1884. It includes a large number of prints, original drawings, and photographs.

A science museum was intended from the first to be founded in connection with the Science and Art Department, and collections were gradually acquired. In 1883 the patent museum was transferred to the department. The collections now housed in the scientific portion of the Victoria and Albert Museum comprise machinery and inventions, including working models operated by means of compressed air, naval models and marine engines, first formed in 1861, scientific apparatus for teaching and research, fish culture collections, founded on the work and bequests of Mr. Buckland, &c. There is a science library of about 80,000 volumes in connection with the museum. Except on students' days the museum is open free to the public from 10 A.M. to 10 P.M., and in recent years it has been open on Sunday afternoons. In May, 1899, Queen Victoria laid the foundation stone of new buildings for the museum, and at the same time the name was changed from South Kensington Museum to Victoria and Albert Museum. The authorities of the museum are a science director, an art director, an assistant director, a senior keeper, assistant keepers, &c. There are referees to advise in the purchase of objects for the museum. The branch museum at Brompton Green was established in 1872. Its principal contents are the collections illustrative of animal products and foods. Many of the objects in the Victoria and Albert Museum may be given out on loan to schools or local museums on certain conditions.

Edinburgh Science and Art Museum—The Natural History Museum of Edinburgh was founded in connection with the University of Edinburgh in 1812, and in 1820 it was opened to the public. In 1854 the town council, at that time the patrons of the university, transferred it to the Department of Science and Art. New buildings were opened in 1866, and additional buildings were completed in 1875 and 1888. The chief official of the museum is the director, and there are keepers for the three departments of natural history, art and ethnography, and technology. The industrial collections in the museum originated in gifts made by the royal commissioners of the 1851 exhibition, the Highland and Agricultural Society, and many manufacturers. In 1866 the present name of the museum was conferred upon it. It includes a library and the collections of the Geological Survey of Scotland.

Dublin Science and Art Museum—By the Dublin Science and Art Museum Act of 1877 the lands, collections, and library of the Royal Dublin Society, which has been in existence for nearly a century and a half, were transferred to the government for £10,000. Owing to the difficulty experienced in obtaining a suitable site the buildings were not erected till 1889-90. There are two chief departments, the art and industrial department and the natural history department. The collections of the Geological Survey of Ireland form a notable feature of the museum, and there is a good collection of Irish antiquities. The museum, like the Royal College of Science, the National Library, and the School of Art, is now under the Department of Agriculture and Technical Instruction.

Geological Survey of the United Kingdom—The Geological Survey of Great Britain was begun in 1832 by Mr (afterwards Sir Henry) De la Beche in connection with the Trigonometrical Survey under the Board of Ordnance. In 1845 it was transferred to the Office of Woods and Forests, and in the same year the Geological Survey of Ireland was begun under Capt (afterwards Sir Henry) James, R.E. In 1853 both surveys were placed under the newly established Department of Science and Art. The Geological Survey of Scotland was made a separate branch under Prof (now Sir Archibald) Geikie. The successive directors general have been Sir H. T. De la Beche (1845-55), Sir Rodrick J. Murchison (1855-72), Sir Andrew C. Ramsay (1872-81), Sir Archibald Geikie (1881-1901), and Jethro J. H. Tull (1901-). The geological survey map of England and Wales on the scale of one inch to a mile was completed in 1883, and the work now in progress comprises the resumption of the drift survey on the scale of six inches to a mile, the resumption of the re-survey of the coal and other mineral districts, the indoor work connected with the one inch sheets recently finished, preparations of explanations of sheets and stratigraphical memoirs, the giving of information to government departments, and the collecting and registering of well sinkings and borings. Owing to the complicated structure of the Highlands the one inch maps of Scotland have not yet been completed, but great progress has been made in recent years. The mapping required for the geological survey of Ireland was completed in 1887, and a careful revision is now in progress. The Museum of Practical Geology in Jernyn Street was originated in 1835, and in 1851 it was opened to the public in its present building. The director general of the survey is director of the museum.

SCIENCES, a term applied to the generalized and systematized divisions of knowledge. Science and philosophy resemble each other in so far as they both have to do with knowledge, but while the latter deals with the whole sum of knowledge, the former takes up special branches of it, and it does not necessarily go back to first principles, like philosophy. Given a sufficient number of interrelated facts, they may be so arranged and classified, by referring them to the general truths and principles on which they are founded, as to constitute a well certified and more or less complete branch of knowledge, that is, a science. 'Science', says Sir William Hamilton, 'is a complement of cognitions having in point of form the character of logical perfection, and in point of matter the character of real truth'. As distinguished from art, a science is 'a body of truths the common principles of which are supposed to be known and separated, so that the individual truths, even though some or all may be clear in themselves, have a guarantee that they could have been discovered and known, either with certainty or with such pro-

bability as the subject admits of, by other means than their own evidence'. The number of sciences has been greatly augmented since about the fifteenth century, when scholasticism received its death blow, and the interest in the study of nature was revived. Previous to that time the sciences were reckoned as seven in number, namely, grammar, logic, rhetoric, arithmetic, geometry, astronomy, and music. Now it would be difficult to state precisely how many sciences there are. This difficulty also extends to their classification. According to the different ways of regarding them they may be broadly divided into theoretic or pure, and applied or practical, synthetic and analytic, deductive and inductive, or otherwise. Taking the first of these classifications as suitable to our present purpose, applied science may be defined as 'a knowledge of facts, events, or phenomena as explained, accounted for, or produced by means of powers, causes, or laws, pure science as the knowledge of these powers, causes, or laws considered apart or as pure from all applications'. The practical sciences are the application of scientifically obtained facts and laws to some practical end. To the class of pure or fundamental sciences belong mathematics, physics, chemistry, biology or vegetable and animal physiology, and psychology, to the applied or concrete belong geology, mineralogy, botany, zoology, meteorology, geography, &c. The fundamental sciences have a definite sequence. Mathematics comes first, because, dealing as it does with quantity, it is independent of all the other sciences, and yet though it does not borrow from any of these, its laws underlie them all. Closely connected with mathematics is physics or natural philosophy, which embraces two distinct branches, molar and molecular physics, the former including mechanics, hydrostatics, hydraulics, acoustics, pneumatics, and astronomy, and the latter heat, light, and electricity. Chemistry succeeds physics, for it assumes all the physical laws as they are known. Biology involves the laws of the three preceding sciences, in addition to the more special laws of the science itself—the vital laws, as they are denominated. Psychology, or the science of mind, is separated by a wide gulf from any of the foregoing, though from its connection with our organism it is more or less intimately associated with physiology. Sociology, or the laws of man in society, is by some reckoned as a sixth fundamental science. The practical sciences are all related to and dependent on the primary sciences, but are too numerous and varied to admit of being regularly classified. As practical sciences may be mentioned ethics, politics, law, jurisprudence, logic, grammar, rhetoric, philology, and political economy, navigation, engineering, and practical mechanics, surgery, midwifery, materia medica &c.

SCILLY ISLANDS, a group at the entrance to the English Channel, forming part of Cornwall, about 30 miles from Land's End. They rise abruptly from the sea, form a compact group about 30 miles in circumference, and are said to amount altogether to about 140 in number, but there are only six of any importance, the remainder being mere rocks and islets. The six are St Mary's, St Agnes, St Martin's, Treco, Bryher, and Sampson. The islands consist mainly of granite, which in some places assumes very remarkable forms. The climate is very mild and equable, and plants are thus enabled to flourish here out of doors that could hardly be seen growing anywhere else in England. The inhabitants are chiefly engaged in flower growing, agriculture, and fishing. Immense quantities of narcissus and similar flowers are sent to London in spring, and early potatoes and other vegetables are also grown. The grain crops include a small proportion of

wheat. On several of the islands are to be seen remains of rude pillars, circles of stones, kistvaens, rock basins, and cromlechs. The islands are the property of the crown. Pop (1891), 1911

SCIMITAR, a kind of sword in use among eastern nations. The blade is nearly semicircular in form, with the edge upon the convex side. This form, while ill adapted for thrusting, is admirably adapted for striking.

SCINDE. See **SIND**.

SCINDIA'S DOMINION. See **SINDHIA'S DOMINION**.

SCIO, or **SKIO** (ancient *Chios*, Turkish, *Saki Adass*), an island of Asiatic Turkey, in the *Ægean Sea*, separated from the coast of Asia Minor by a channel not more than 7 miles wide where narrowest, and about 53 miles west of Smyrna. It is of a somewhat quadrangular form, 32 miles long from north to south, with a mean breadth of about 12 miles, area, 508 square miles. The surface exhibits a number of limestone ridges, separated from each other by verdant and fertile valleys, and presents much scenery of a very beautiful description. There are no perennial streams, but an abundant supply of water, both for domestic and agricultural purposes, is obtained from numerous large wells. In this way a constant verdure is maintained, and valuable crops are raised. The principal products are wine, oil, cotton, silk, and more especially mastic, which may be considered as the staple of the island. The quantity of cereals is very limited. The trade is chiefly in dried fruit, preserves, cattle, and salt. Population, of whom a large portion are Turks, about 70,000. Before the war of Greek independence Scio was peopled almost entirely by Greeks, who enjoyed greater privileges than were usually conferred on their countrymen, and were generally in comfortable circumstances. Their number at this time has been estimated at 130,000. The part which they took in the war appears to have exasperated the Turks beyond measure, and provoked them to retaliate by fearful atrocities. Having made themselves masters of the island in 1822, they are said to have put 40,000 persons to the sword, often under circumstances of horrid cruelty. Scio contends for the honour of having given birth to Homer. Notwithstanding its ancient celebrity, it possesses few antiquities. In April, 1881, the island suffered dreadfully from repeated shocks of earthquake, almost all the houses being thrown down and many thousands of people being killed and wounded.

SCIO, or **KASTRO**, the chief town of the island of Scio, situated near the middle of the east coast, consists of houses built for the most part of hewn stone or brick, and generally with terraced roofs. It is defended by a castle, and carries on a considerable trade. In 1881 it was thrown in ruins by an earthquake. Its harbour, which is formed by two moles, has two lighthouses. Pop 14,500.

SCIOPIUS, **KASPAR**, a celebrated *satirist* and controversialist, was born at Neumark in the Palatinate, May 27, 1576. He studied at Heidelberg, Altdorf, and Ingolstadt, and afterwards, in 1589, travelled in Italy. Having here attracted the notice of Pope Clement VIII., who thenceforth became his patron, he renounced Protestantism, and the whole of his subsequent career was marked by venomous attacks on his former co-religionists. In a work against Joseph Scaliger, who had incurred his enmity for some remarks he made regarding his conversion to Catholicism, he ridiculed with the bitterest satire the ancestral pretensions of that author, and also attacked Henry IV. of France for having granted civil liberty to the Protestants. In 1608 he published several other works against the

Protestants. In the following year, being at Venice, and interfering in a dispute the Venetians had with the pope, he was cast into prison, but was soon after set at liberty, when he visited Vienna, and was raised by the emperor to the rank of count palatine. In 1611 he published two works against James I. of England, for which he got a severe castigation a few years later in Madrid from the servants of the English ambassador. Not thinking his life safe there he fled from Spain to Ingolstadt, and there issued his *Legatus Latro* against the ambassador. In 1617 he settled at Milan, and renewed more fiercely than ever his pen and ink warfare with the Protestants, who, he declared, ought all to be exterminated, man, woman, and child. In the intervals of this to him congenial occupation he devoted himself to philological studies. The Protestants were not the only ones who felt the weight of his pen, the Jesuits likewise came in for a share of his hate, in consequence of their refusal to do him some favour. His rancorous life terminated November 19, 1649. Sciopius was a man of immense learning, prodigious memory, and great acuteness, but 'his quarrelsome disposition, his strong inclination to satire, and his intolerance, constantly involved him in disputes which reflect discredit upon his character.' Of his works, which are stated at over one hundred, many of which, however, he published under assumed names, the most important are *Verisimilium libri IV* (Nürnberg, 1596), *Suspectarum Lectionum libri V* (Nürnberg, 1597), *Commentatio de Arte Critica* (Nürnberg, 1597), *Grammatica Philosophica* (Milan, 1628), *Paradoxa Literaria* (Milan, 1628), &c.

SCIOTO, a river of Ohio, in the United States. Its general course is south, its length about 200 miles, and it flows into the Ohio River by a mouth 150 yards wide, between Portsmouth and Alexandria. It is navigable for boats about 130 miles, and is connected with the Sandusky by a portage 4 miles long. The country watered by this river is known by the name of the Scioto country, and is remarkably fertile.

SCPIO AEMILIANUS AFRICANUS MINOR, **PUBLIUS CORNELIUS**, son of L. Aemilius Paulus, the conqueror of Macedonia, and adopted son of P. Cornelius Scipio, the son of Scipio Africanus Major, was born about 187 B.C. He began his public career at the age of thirty, when the Roman senate was about to despatch a new army to repress the disturbances in Spain. Exasperated by the constant failure of the wars against the Spanish tribes, the people obstinately refused to serve. At this juncture Scipio came forward, and by a spirited and powerful harangue, made such an impression on the public mind that a multitude of Romans of all classes voluntarily enlisted. In B.C. 162 he accompanied the consul Lucius Lucullus to Spain as military tribune, and by his disinterestedness, courage, affability, and firmness gained the love and esteem of the army, at the same time conciliating the Spaniards by his magnanimity and kindness. In B.C. 149 the third Punic war broke out, and Scipio followed the army to Africa. He served under the consul M. Manlius Nepos, and by his courage and vigilance rendered important services to the cause of the Romans, acquiring the admiration and esteem of friend and foe alike. Manlius, his commander, could not forbear to recommend the young hero in the most emphatic manner to the senate. Hence in B.C. 147, contrary to the usual custom, not being of the legal age, he was unanimously chosen consul and leader of the forces against the Carthaginians. Accompanied by his friends and among them Polybius, the Greek historian, he proceeded to the seat of war and assumed the command of the Roman troops. The

Carthaginians defended themselves with a desperate courage, and displayed the greatest heroism and sternest resolution, but although they were able to hold out until winter brought a temporary cessation of hostilities, on their resumption the genius of the general and the perseverance of the devoted troops effected the reduction of Carthage (which see) B.C. 146. Lælius, the valiant friend of Scipio, first ascended the walls of the city with his soldiers. With unparalleled fury the Carthaginians resisted the Romans, even after they had entered the city, and much blood was spilt before the conquerors could fully reduce it. By the express command of the Roman senate this rival of Rome, once so powerful, was demolished and burned. The sight of the ruined city affected Scipio to tears. He was honoured with a magnificent triumph at Rome after the war was terminated, and was surnamed the *younger Africanus*. After he had lived for some time as a private citizen he was sent with other ambassadors to Egypt, to King Ptolemy Lucius, where he was much admired for his genuine Roman moderation, and his noble thirst for knowledge. When he returned (B.C. 142) he was elected censor. In this office he frequently urged the degenerate Romans to return to the simplicity and frugality of their fathers, he even punished severely some respectable citizens for their extravagance. B.C. 134 he entered on his second consulship, in order to put an end to the war which had long been carried on with Numantia, a bravely defended city in Spain. After a siege of eight months he forced the citizens, who were dying of hunger, to surrender. For his conquest of this powerful city a triumph was decreed to Scipio, and he received the surname of *Numantinus*. In the last years of his life he made himself many enemies among the people by opposing the measures of the popular party, and especially the agrarian law of Tiberius Gracchus, of which Papirius Cæbo, and C. Gracchus, the tribunes of the people, were the great supporters. On the morning after giving his support in the senate to a measure which would have rendered the law nugatory, and which was keenly opposed by the leaders of the people, Scipio was found dead in his bed (B.C. 129). Who murdered him never transpired, but Cæbo was strongly suspected of having done the deed. Like the elder Scipio Africanus, he was a Roman of the highest stamp, he united courage with magnanimity, wisdom with humility, patriotism with moderation and forecast, and benevolence with unshaken probity.

SCIPIO AFRICANUS MAJOR, PUBLIUS CORNELIUS, one of the most illustrious of Roman warriors, was born about 235 B.C. His first public appearance was at the battle of the Ticinus in 218 B.C., where he is said to have saved the life of his father. Two years later he was one of the few who escaped from the fatal battle of Cannæ, when he succeeded in gathering together the remnants of the defeated army, and by his courage and resolution was the means of saving Rome. In 212 B.C. he was unanimously elected ædile, and a few years after was appointed proconsul in Spain. Here he overcame the enemy, not merely by his courage and conduct, but also by his magnanimity and kindness. His first successful enterprise of importance was the conquest of New Carthage, the stronghold of the Carthaginians in Spain. For the kindness and magnanimity he displayed on this and other occasions towards the native Spaniards he was rewarded by numbers of them attaching themselves to his standard. The next year (209 B.C.) Scipio totally defeated Hasdrubal, Hannibal's brother, notwithstanding his advantageous position, but was unable to prevent him collecting more troops, and eventually crossing the

Pyrenees to the assistance of Hannibal. In the meanwhile the Carthaginians collected a fresh army, which was led by Mago and Hasdrubal the son of Gisco. Scipio attacked them and after a long and bloody engagement destroyed the greater part of them. The result of this and subsequent engagements of minor importance was that the Carthaginians were wholly driven from Spain, and the greatest part of that country subjected to Rome. The victorious general entered Rome in triumph amid the loudest acclamations of the people. Scipio now besought the senate to allow him to lead an army against Carthage herself, and he was accordingly empowered to go to Sicily with an army and a fleet, in order, after mature deliberation on the means of effecting a landing on the coast of Africa, to execute the plan which he had formed. From Sicily Scipio despatched his friend Lælius to make a descent on the African coast. This expedition was so far successful as to determine Scipio to lead across all his forces, but during the first campaign he was unable to effect much. His proconsulate, however, being prolonged until the war should be terminated, he prosecuted hostilities with increased vigour, and with such success as to oblige the Carthaginians to recall Hannibal from Italy. The Carthaginian army, however, had been by this time so much reduced that the general was able to effect but little, and after some fruitless negotiations for peace the great battle of Zama was fought 19th October, 202 B.C., which resulted in the total defeat of the Carthaginians. The latter, on the advice of Hannibal, sought for peace, which was granted on very hard conditions. On his return to Rome Scipio was honoured with a triumph, and received the surname of *Africanus*. After this he discharged, in a praiseworthy manner, the office of censor, but he lost the favour of the people, because he defended with zeal the pretensions of the senate. He afterwards became his brother's lieutenant, when the war broke out with Antiochus, king of Syria. This war was brought to a successful close in B.C. 189, and Scipio thereupon retired into private life. He was not long permitted to rest, however, without expiating the enmity of a party in the state who were hostile to him. First his brother Lucius was imprisoned and his property confiscated, on an alleged charge of misconduct in his dealings with Antiochus. This was followed up by charges brought against Scipio himself. When his trial came on he contented himself, in answer to the accusations of his enemies, with reminding them of what he had done for the republic, and ended by saying that this was the anniversary of the defeat of Hannibal at Zama, and called upon the people to neglect all disputes and lawsuits, and following him to the Capitol, there return thanks to the immortal gods, and pray that they would grant the Roman state other citizens like himself. The effect of his speech was to strike shame into the minds of the people, who immediately followed him to the Capitol, leaving the accusers alone in the forum. Scipio immediately quitted Rome, and retired to his villa at Liternum, where he spent the few remaining years of his life. He died, it is believed, in B.C. 183, the same year as his great opponent Hannibal. On his death-bed he is said to have requested that his bones should be buried at Liternum, and not in his ungrateful country.

SCIRE FACIAS, a judicial writ, most commonly used to call a man to show cause to the court whence it issues why execution of judgment passed should not be made out.

SCIRPUS. See BULRUSH.

SCIRRHUS, or HARD CANCER, is the most frequent variety of cancer. It has its seat sometimes in the stomach, rectum, and elsewhere, but by far

most frequently it attacks the female breast. If detected in time it can be removed from the breast with every prospect of success.

SCISSOR-BILL (*Rhynchops nigra*), a genus of Laridae or Gulls, so named from the possession of an elongated beak of compressed form, the lower mandible exceeding the upper one in length, and shutting into the latter somewhat after the fashion that the blade of a knife does into its handle. This curious beak is of an orange colour at its base, and black at its tip. This bird, which inhabits the coasts of America and Africa, is coloured of a dark brown on the upper aspect of the head and body, the under surface being white, and a band of white running across the wings. The nests are constructed on marshy grounds and islands. The eggs number three, and are of a white colour, spotted with brown. The average length of the Scissor bill is about 1½ foot. In its habits it appears to fly swiftly across the surface of the water, skimming the sea with its bill, and in this way picking up surface molluscs and crustaceans, whilst it also appears to feed on the coasts and to dexterously open the shells of molluscs.

SCISSORS See CUTIFRY.

SLAVONIA See SLOVONIA.

SCLERODERMIC and SCLEROBASIC CORAL These terms are applied to indicate the two great varieties of corallum, or coral substance (see CORAL) secreted by the Actinozoa, or highest group of Coelenterate organisms. The sclerodermic variety is the most typical of the two kinds, and is represented by such forms as the Madreporae, Milk-pores, Fungidae, or 'Mushroom Corals', Astréidae, or Star Corals, Meandrina, or Brain Corals, Rugosa, and by many other groups. The sclerodermic coral is secreted as its first characteristic, within the tissues and bodies of the polypes or secreting animals, the tissue which is more immediately connected with its formation being the *ectoderm* or inner layer of the ectoderm (see SEA-ANEMONE). The ectoderm, it may be further noted, forms the outer layer of the body in Coelenterata, the inner or second layer into which the body tissues are divisible being known as the *endoderm*. Dana terms the sclerodermic coral a *tissue secretion*, from the fact of its intimate relations to the tissues of the Actinozoa. This variety of coral may readily be recognized from the fact that the living parts of each polype are more or less perfectly represented in the coral structure, and it may be represented as the secretion of a single polype, or as that of a compound organism. The parts to be distinguished in the sclerodermic coral secreted by each polype comprise, firstly, a cylindrical outer wall known as the *theca*, which corresponds to the circular body wall of the Actinozoon which secretes the corallum. The upper part of the space within the theca is vacant, and is occupied during life by the living parts of the secreting organism. To this upper portion the name of *calice* has been given. Below the calice the lower portion of the thecal chamber is divided by vertical partitions named *septa*, which radiate from a common centre outwards towards the theca itself. These septa thus divide the thecal chamber into a number of loculi or chambers, and spring from the common centre formed by a pillar or column rising from the base of the thecal chamber, and to which the name of *columella* is given. Some of the septa springing from the thecal walls do not reach the central columella, but stop short of that structure. These latter septa are therefore termed secondary and tertiary septa, accordingly as they are of longer or shorter extent, or they may simply be termed *pali*. The septa of the sclerodermic corallite, as the coral structure of each coral secreting polype is termed, correspond to the mesenteries

(primary, tertiary, and secondary), or vertical partitions seen in the ordinary Actinozoa—such as the Sea anemones—whether secreting coral or not. And the columella, or central pillar, occupies that part of the interior of the body cavity of the polype, which lies below the imperfect or open digestive sac or stomach of these forms, and which forms the floor of the somatic or body cavity.

In addition to the vertical septa and pali, well seen in the transverse section of a sclerodermic corallite, certain other partitions must also be noted. Thus, when a longitudinal section is made of many such corals, transverse partitions or *dissepiments* springing from the sides of the septa may be seen, and these transverse partitions, therefore, divide the loculi or chambers in a more or less complete degree. Occasionally also the septa may exhibit their sides as bearing processes, which may unite with neighbouring processes so as to form what are termed *synaptulae*, or cross-bars or props running across the loculi like the bars of a grate. Sometimes also, instead of the dissepimental partitions just described, horizontal partitions named *tabulae* may be developed, which extend like complete flats or floors of a house across from wall to wall of the theca. Externally, and on the outer surface of the theca, vertical ribs or lines named *costae* may be developed, these latter corresponding to the internal septa. And *ectotheca* arising from the sides of the costae may represent external dissepiments, whilst an outside layer known as the *epitheca* may correspond to extrinsic and coalesced tabulae. Lastly, the common medium or coral substance secreted by the individual polypes of a compound mass, and which serves to connect and bind together these polypes, is known as the *cementum*, this latter corresponding to the *mesosarc*, or connecting medium formed by the living tissues of the polypes. Sometimes, as in the family Alcyoniidae, the sclerodermic corallum may be represented simply by detached spicules, or needle-like bodies of calcareous or lime nature. In Tabulate Corals the transverse partitions known as tabulae are well developed, these partitions being also well seen in many Rugosa (which see). In the Organ pipe Coral (*Tubipora musica*) the thecae forming tubes for the polypes, and the epitheca, which form external tabulae or horizontal floors, are well exemplified.

The sclerobasic, or second variety of coral structure, is very different in its nature from the sclerodermic kind. The sclerobasic corallum is well exemplified in the Red Coral (*Corallium rubrum*) of commerce, in the *Isis hippuris*, or Mare's tul Coral, in the Pennatulidae, or Sea-pens (see PENNATULA), in the Gorgonia, &c. It is termed by Mr Dana a 'foot secretion,' in contradistinction to the tissue secretion or sclerodermic variety, and in reality partakes of the nature of an exoskeleton, similar to the shell of a crab, for example, in that it is formed by the outer surface of the ectoderm—the external layer of the body of the secreting polypes. The sclerobasic coral further forms a hard internal axis, upon which the living polypes are supported, and which they serve at the same time to conceal. A piece of red coral, for example, may in this way be compared to a tree, the bark of which is represented by the living polypes, whilst the internal parts correspond to the hard coral structure. At the same time, it is to be noted that as the sclerobasic coral is formed by the ectoderm or external surface of the polypes, and as it exists in the form of an internal axis, the external secreting surface of the polypes is *inverted* and turned inwards, this inversion of the external surface serving to explain what would otherwise appear a most anomalous circumstance. The sclerodermic coral was noted to be readily distinguished by its showing the

separate cups or coral structures secreted by the individual polypes. The sclerobasic coral, on the other hand, is perfectly smooth, and presents no such separate cups or structures to show where the individual polypes were lodged—since, in fact, as already remarked, the polypes themselves are situated externally to the sclerobasic coral axis. In this view the sclerobasic coral is also seen to be invariably associated with compound organisms, since it is really formed, not by the tissues of the polypes themselves, but by the cœnosarc or connecting medium which binds the various individual members of a colony together.

SCLEROTIC COAT See EYE

SCOLECIDA, a class of animals usually included in the sub kingdom Echinozoa or Annuloida, and represented by such forms as the Taniada, or Tape worms, by the Nematelmia (see these articles), and by other forms both of parasitic and non parasitic habits. The name Scolecida may in greater part, so far as the majority of its included organisms is concerned, be regarded as synonymous with the more general name Entozoa, or Parasites, but the class Scolecida, at the same time, includes several groups of animals which are not in any sense parasitic, and which evince a structure more or less nearly allied to that of parasitic forms. Such non parasitic forms are represented by the Rotifera (which see), or Wheel animalcules, now generally placed among the Scolecida, by the Turbellaria, and a section of the Nematod Worms. It may lastly be noted, that whilst the name Entozoa may be retained for general use, and to include the parasitic forms, it must be abolished in a scientific sense, and when the class Scolecida in its entirety is discussed. None of the forms included in this class are 'worms' in the popular acceptance of the term. Many are undoubtedly worm like in form, but possess no further connection or relationship with the great group of the Annelida, or true Worms, which is represented by such forms as the Leeches, Earth-worms, &c. The characters of the class Scolecida, as a class or main division of animals, and those which relate them to the class Echinodermata (See urchins, Star fishes, &c.), may perhaps be limited to the possession of a system of vessels communicating with the exterior of the body and branching out within their bodies, and known as the 'water vascular' system. The possession of this system, indeed, forms the one great characteristic by which the class Scolecida retains its place among Echinoderm animals, and through which it becomes allied to the well defined group of Echinodermata. Recognizing this one character, the further constitution of the Scolecida must be looked for in the characters presented by its divisions, which evince among themselves great differences in structure and habits. And it must be regarded as no light or easy task for the taxonomists of the future to classify and arrange in a more satisfactory manner the heterogeneous groups included in this aberrant class.

The Scolecida are divided into the divisions *Platyelmia*, or Flat worms, *Nematelmia*, or Round worms, and *Rotifera*, or Wheel animalcules. The *Platyelmia* include the orders *Taniada* (Tape worms), *Trematoda*, or Flukes, and *Turbellaria* (non parasitic forms such as Planaria and Nemertidans). The *Nematelmia* are represented by the orders *Acanthocephala* (Thorn-headed worms), *Gordiacea*, or Hair-worms, and *Nematoda*, or Round worms. Whilst the *Rotifera*, described in the article of that name, are non-parasitic, free organisms, which, save in the possession of the water vascular system, exhibit no affinities with Scolecida in general. See also *NEMATELMIA*, *PARASITES*, *PLATYELMIA*, &c., and illustrations at the article *MOLLUSCA*.

SCOLOPENDRA See CENTIPEDE and MYRIAPODA

SCOMBER See MACKEREL

SCONE, a village of Scotland, a little above Perth, on the Tay, with Established and United Free Presbyterian churches. The village of New Scone consists of neatly built houses, and contains 1483 inhabitants, chiefly engaged in handloom weaving. Of Old Scone the principal remains are a market-cross. Its ancient abbey, in which the kings of Scotland were wont to be crowned on the stone of destiny, now in Westminster Abbey, is only represented by inconsiderable ruins, and on the site of its ancient palace now stands the elegant modern mansion of the Earl of Mansfield.

SCORE, in music, the original draught, or its transcript, of a musical composition, with the parts for all the different voices or instruments arranged and placed in juxtaposition, so called from the practice of drawing the bar through all the parts. As a general rule the highest part should be placed uppermost, the others under it and each other, according to the lowness of the part. All the parts of a chorus should be placed together: the soprano standing on the upper staff, the mezzo or second soprano (if any) on the one immediately below it, and so descending in the following order—contralto, second contralto (if any), tenor, second tenor (if any), bass, and, lowest of all, second bass (if any). A good musician is able to form a pretty close idea of the effects the composer intends to produce by carefully reading the score. *Short score* is a compressed method of writing concerted vocal music on two clefs, the soprano and alto being arranged on the treble or G clef, and the tenor and bass on the bass or F clef, ledger lines being used for the lower alto or the higher tenor notes.

SCORESBY, WILLIAM, an eminent Arctic navigator, was born at Cropton, in Yorkshire, 5th October, 1789. His father was noted as one of the most daring and successful commanders in connection with the northern whale fishery, and his son adopted the same career, making his first voyage with him on board the *Dundee* while yet only ten years of age. In 1803 father and son sailed on board the *Resolution* of Whitby, and made voyages together for the next eight years, the elder Scoresby acting as commander and the younger as chief mate. The latter kept a careful journal of the voyages, and during the winter months, when the vessel was laid up in port, attended classes in Edinburgh University, where he soon made himself proficient in all the branches of knowledge connected with his profession, including, more especially, natural history and physical science. While engaged in the Arctic whale fishery the *Resolution* attained in May, 1806, the successive latitudes of 80° 50' 28", 81° 1' 53", and 81° 12' 42" N., and once reached as far north as 81° 30', the nearest point to the pole until then reached by ordinary navigation. In 1811, when young Scoresby had just attained the age of twenty-one, the command of the *Resolution* was resigned by his father, and he was unanimously elected his successor by the owners. Through information communicated by him to Sir Joseph Banks, government was induced in 1817 to fit out an expedition under Sir John Ross to discover the north-west passage, an object which occupied the attention of the admiralty for several years, and after being abandoned for some time was accomplished in 1850 by Sir Robert McClure. In 1820 Captain Scoresby published a work entitled *An Account of the Arctic Regions, with a History and Description of the Northern Whale-fishery*, which established his reputation as one of the most original observers and scientific navigators of the day. It was followed in 1823 by a *Journal of a Voyage to the Northern*

Whale-fishery, including Researches and Discoveries on the Eastern Coast of West Greenland. About the same time he quitted the whale fishing, and in 1824 was elected a fellow of the Royal Society. Always a man of deep religious views, these were strengthened in his retirement, and he resolved to devote himself more exclusively to the promotion of Christian faith and practice. He accordingly entered himself as a student for the church at Queen's College, Cambridge, took his degree of B.D. in 1834, and shortly afterwards received holy orders with the degree of D.D. His first charge was the Mariner's church at Liverpool, then just established, and from this he afterwards removed first to Exeter, and then to Bradford, in Yorkshire, of which he acted as vicar for several years. Latterly he resigned his office, and retired to Torquay, in Devonshire, where he died on 21st March, 1857, at the age of sixty-eight. Though mainly occupied by the duties of his sacred calling, in the prosecution of which he laboured with great earnestness and acceptance, Dr Scoresby retained to the last a lively interest in scientific investigation, and more especially in that of magnetism and its relation to navigation. Various treatises were published by him on this subject in the Philosophical Transactions, the Transactions of the Royal Society of Edinburgh, the Reports of the British Association, and the Edinburgh Philosophical Journal. They were afterwards given to the world in an improved and enlarged form, under the title of *Magnetical Investigations*, of which the first part appeared in 1839, the second in 1843, and the third in 1852. With the view of pursuing his researches in magnetic science, and more especially determining the influence exerted over the compass by iron vessels, he made a voyage to Australia in the ill-fated *Royal Charter*, which afterwards perished so disastrously on the Welsh coast. He was received with great distinction at Melbourne, and had the degree of M.A. conferred on him by the recently created university in that city. In addition to the works already mentioned, Dr Scoresby is the author of *Lectures to Seamen, Memorials of the Sea*, comprising—1, *Sabbaths in the Arctic Regions*, 2, *The Mary Russell*, 3, *My Father*, being records of the adventurous life of the late William Scoresby, Esq., of Whitby, and 4, *The Franklin Expedition*. He also published a treatise entitled *Zoistic Magnetism, or original researches in Mesmeric Phenomena*. A biography of him was published by his nephew, R. H. Scoresby (8vo, London, 1861).

SCORPION (see ENTOMOLOGY, Pl. III.), a genus of Annulose animals (Arthropoda) belonging to the class Arachnida, which also includes the Spiders, Mites, Ticks, &c. Like all other Arachnida the Scorpions possess eight legs, but they are distinguished from the Spiders by the possession of a distinctly ringed or annulated tail or abdomen, terminating in a hooked claw or 'telson,' which latter is in reality the outlet and fang of a poison gland situated at its base. The tail or abdomen consists of twelve somites or segments, and it merges gradually into the anterior cephalothorax, consisting, as in all Arachnida, of the united head and chest. The four pairs of limbs are borne by the thorax or chest segments, and the maxillary palpi (organs of touch belonging to the maxillæ or lesser jaws) are largely developed, and constitute a pair of formidable nipping claws or chela. These latter appendages, therefore, give these animals the appearance of being provided with five pairs of limbs. No true antennæ or feelers are developed as in insects, but the mandibles, or larger jaws, which also terminate in nippers or cheliceræ, are believed in reality to represent the antennæ of other Arthropodous classes. The breathing in the

Scorpions is carried on by means of pulmonary or lung sacs, each of which is formed by an involution of the integument of the body, and contains lamellæ or vascular plates, in which the blood is exposed to the air, admitted to the sacs through special apertures known as stigmata. In Scorpions four pairs of pulmonary sacs exist, and these exist on the sides of the body, the stigmata being each surrounded by an elevated ridge or margin, named a peritreme.

The Scorpions are included in a special order of the class Arachnida, known as the order Arthrogastra ('jointed abdomens') or Pedipalpi—the latter name having been applied to the division from the foot-like character of the maxillary palpi. The eyes, which are of the simple kind, and are named ocelli, number six, eight, or twelve. Behind the last pair of legs in the Scorpions two curious comb-like appendages are found. The function of these appendages is unknown, but the generative organs open between them. The female Scorpions are said to exhibit great care for their young, and carry them on their backs for several days after being hatched, whilst they tend them carefully for about a month, when they are able to shift for themselves. Scorpions generally live in dark places, and under stones. The food consists chiefly of insects, which they seize by means of their chela, and sting to death. The sting is not necessarily fatal to man, but may prove dangerous to persons of weakly constitution. The poison is said gradually to lose its effect on man, so that the more frequently a person is stung the less noxious do the effects of the sting become. Painful effects follow the sting, such as nausea, swelling of the bitten part, &c. The remedies most to be relied upon appear to be ammonia, tobacco, specuanha, &c., together with warm applications to the limb, and attention to prevent the spread of the virus, as by tying a ligature above the wound, to prevent the poison spreading through the circulation.

The Scorpions chiefly inhabit warm and tropical regions, several genera (*Androctonus*, &c.) being comprised within the order. The *Buthus afer*, or Hook Scorpion (which see) of Africa, is one of the most familiar species.

The Book Scorpions (Cheliferidæ, see fig. 51 on plate), of which a common species is the *Chelifer Widen*, are so named from their presenting a close resemblance in outward form to the true Scorpions. The Book Scorpions are, however, included in the lower group (*Taracheura*) of the class Arachnida, and are distinguished by the fact that the maxillary palpi are very large, and form nipping claws, whilst they want the jointed tail of the true Scorpions. They are generally found living amongst old books, and feed on the minute insects which also inhabit such situations. These Arachnidans are usually included in the order Adelarthrosomata, which also comprises the well-known Harvest Spiders, or Phalangidæ (which see). The general colour of their bodies is a brownish red. An allied genus, *Obisum*, also occurs in libraries, this latter being distinguished from the Chelifers by the entire cephalothorax, that of *Chelifer* being marked by a transverse groove, whilst *Chelifer* possesses two and *Obisum* four eyes. See also ARACHNIDA.

The Scorpions are first represented in a fossil state in the Carboniferous Period. In these rocks the genera *Locoopus* and *Cyclophthalmus* are found, the former of the Bohemian coal measures being the most remarkable form. This species possessed twelve eyes, disposed in a circular manner.

SCORPION FISH, or SEA-SCORPION (*Scorpana*), a genus of Teleostean (Acanthopteroi) fishes, belonging to the Triglidae or Gurnard family. In this genus the body is covered with prominent scales, and

the occiput is grooved. The first dorsal fin possesses eleven spines, the second dorsal possessing one spiny ray and nine or ten soft rays. The anal fin is short, and has three spines and five soft rays. The Red Scorpion-fish (*Scorpena scrofa*) is a familiar form, and is recognized by its red colour, marked with brown on the fins and body. A large brown patch marks the first dorsal fin, lying between the sixth and ninth spines. Its average length is about 18 inches. The flesh is unpalatable and dry, but an oil is obtained from the liver. The head is armed with spines and angular projections, which have no doubt gained for these forms their name of Scorpion fishes. The Spotted Scorpion fish (*S. porcus*) is a second species, and, like the preceding form, occurs in British waters, as well as in the Mediterranean, Atlantic, and tropical seas. The latter species is brownish red, spotted with black, and marked with brown. The average length is from 12 to 15 inches. The head and mouth are large, as in the former species, and provided with spines and projections. The pectoral fins are rounded, of large size, and the ventrals are jugular in position—that is, are placed beneath the pectorals on the throat.

SCORPION-FLY (*Panorpa*, see PL I at ENTOMOLOG), a genus of insects belonging to the order Neuroptera, or that of the Dragon flies, and included in the family Panorpidæ, of the sub order Pleuripennia. The head in this genus is prolonged to form a beak or rostrum. The body is long and slender. The legs are long, the tarsi being five jointed, and two spur like processes exist on the tibia or shins. The name Scorpion fly is derived from the appendages seen attached to the abdomens of some species. The milk in the common species, for example, has the sixth and seventh joints of the abdomen attenuated, and capable of extensive motion, whilst the last joint forms a pair of forceps resembling those of the harwig. When at rest this tail is curled over the back, but when irritated the forceps are used as weapons of offence or defence. The antennæ are long and slender, and three ocelli or simple eyes exist. These forms are found chiefly in damp situations, and in the vicinity of hedges. The mouth is placed at the extremity of the rostrum.

SCORPION SHELL, the name given to the shells of certain Gastropodous Molluscs, belonging to the family Strombidæ, from the projecting spines with which the shells are provided. These shells are also known by the name of 'Spider shells' for the same reason. The Common Scorpion or Spider-shell (*Pteroceras lambis*) is coloured of a mottled chestnut, variegated with white and orange lines. Internally its hue is pale brown and yellow. Its length is 3 or 4 inches. The Orange Mouthed Scorpion shell (*P. aurantiacæ*) is coloured a creamy white outside, and orange within, and its curved spines are white and of glistening appearance. The characteristic feature of these shells is the possession by the outer lip of the shell of the elongated processes already alluded to, and one of these processes forms a posterior canal close to the suture of the shell. These shells are chiefly found in the Indian and Chinese Seas, and the genus *Pteroceras* is represented by many fossil species, beginning in the Liasic formations. *P. Oceanæ* (Neocomian) is a familiar fossil species.

SCORZONERA, a genus of plants of the natural order Compositæ, sub order Chicoracæ, with yellow and occasionally rose-coloured flowers. The species, which are numerous, are chiefly indigenous to Southern Europe and the East. The Common Scorzonera (*S. hispanica*), a native of Spain and the south of Europe, has long been cultivated in English kitchen-gardens for its edible roots. The root is about the

thickness of a man's finger, is dark-brown outside and white within, long and tapering gradually. It contains a milky-like juice, and has a mild sweetish gummy taste. It is prepared by scraping off the outer rind, steeping in water to divest it of its bitterness, and then boiling. The name Viper's Grass is sometimes given to this plant, either from the shape of the root, or from its supposed properties of curing snake bites. *S. glastifolia* has roots similar in quality, *S. delavosa* is the species most cultivated as an esculent at Palermo, and the gummy root of *S. tuberosa* is eaten by the Kalnucks.

SCOT, REGINALD or REYNOLD, one of the first and boldest writers against the belief in witchcraft, alchemy, astrology, and other prevalent superstitions of his time, was a grandson of Sir John Scot of Scotshall in Kent, and was born probably about 1538. He studied at Hurt Hall, Oxford, but returned home without taking a degree, and devoted himself to the study of old and obscure mystical authors, and the pleasures of gardening, until his death in 1599. The work on which his honourable reputation is founded is entitled 'The Discoverie of Witchcraft', and was published in 1584, its design, says its author, is to 'prove the common opinion of witches contracting with devils, spirits, familiars, and their power to kill, torture, and consume the bodies of men, women, children, and other creatures by disease, their flying in the air, &c., to be but imaginary and croneous conceptions', and to expose the practices of witchmongers, conjurers, enchanters, and soothsayers, also the delusions of alchemy, astrology, legerdemain, 'and many other things that have long been hidden, though very necessary to be known for the undeceiving of judges, justices, and jurists, and for the preservation of poor people'. The good sense, boldness, and humanity of the writer only brought upon himself the wrath of King James I, who ordered the first edition of the book to be burned by the common hangman and who attempted a reply to it in his 'Demonology'. Refutations were also published by Meric Casaubon, Joseph Glanvil, and others. See Dr Brinsley Nicholson's introduction to his edition of the work (1886).

SCOT and LOT, an old legal phrase applied to all parochial assessments for the poor, the church, lighting, cleansing, and watching. Up till the Reform Act of 1832 the members of Parliament and municipal officers in certain English boroughs were elected by scot and lot voters, that is, those who paid those assessments.

SCOTLER (or **SURF**) **DUCK** (*Ondemia*), a genus of Anatide or Ducks (Natatores), belonging to the Fuliginæ (Pochards) or Sea ducks, which frequent the ocean, and have the hinder toe provided with a broad membranous lobe. The bill in the Scoter is broad, short, has its tip flat, and possesses a tubercle on the upper mandible at its base. The bill is terminated by a nail like process. The sides of the bill are provided with broad laminae or plates, as in all other Lamellirostral Natatores. The wings are not very powerful. The food of the Scoters consists chiefly of Mollusca and other animals, for which they dive and grope in the mud of shallow waters. The most familiar species is the Common or Black Scoter (*O. nigra*), which shows a deep black plumage in the male, the bill and legs being of the same colour. The upper mandible is marked on its dorsal surface by a line of orange colour. This bird averages the common duck in size, and the females are coloured of a dark-brown hue. It occurs in the Arctic regions in summer, but comes southwards to the British coasts in winter. The flesh is unpalatable on account of its strong fishy taste, but this quality permits its being eaten by Roman Catholics

during Lent, and hence in some parts of France these birds are largely shot and captured at that season. The Velvet Scoter-duck (*O. fusca*) is found in the northern Scotch islands, Orkney, &c, in winter, but is less common than the other species.

SCOTISTS See DUNS, JOHN, and SCHOLASTICISM

SCOTLAND, the northern division of the Island of Great Britain, between lat. 54° 38' and 58° 40' 30" N, and lon 1° 46' and 6° 8' 30" W. It is separated from England on the south east by the Tweed, south-west by the Solway Firth, and south partly by the Cheviot Hills and partly by an indefinite moorland tract, known anciently by the name of the Debatable Land, and is bounded east by the North Sea, and north and west by the Atlantic Ocean. The greatest length, from NNE to SSW, between Dunnet Head and the Mull of Galloway, is 287 miles. The breadth varies exceedingly. Measured from north east to south west, between Kinnaird's Head and the Mull of Kintyre, it is 217 miles, and on the parallels of 56°, 57°, and 58° respectively, 120, 125, and 43 miles. Between Alloa on the Forth and Dumbarton on the Clyde the width is diminished to 33 miles, and farther north, where a kind of peninsula is formed by the Dornoch Firth on the east and Loch Broom on the west, it does not exceed 24 miles. These measurements apply only to the mainland, and therefore when the true area is to be ascertained, it is necessary to add the numerous islands which singly or in groups line its coasts, and form one of their peculiar features. On the east coast these islands are so few and small as not to require special notice, but on the north are the two large groups of the Orkneys and Shetlands, each sufficiently large to form a separate county, while on the west a series of groups, known by the names of the Hebrides and Western Isles, stretch almost uninterruptedly from north to south, at a short distance from the coast, and though not formed into separate counties, form no insignificant portion of the whole area of the country. The largest of them are Lewis and Harris, North Uist, South Uist, Skye, Mull, Jura, and Islay. In the south west the islands of Arran and Bute (with the Cumbraes, &c) have been deemed of sufficient importance to be formed into a separate county under the name of the county of Bute. The total area of the country, including the islands is 29,819 square miles, or 19,084,660 acres, the population in 1891 was 4,025,617, or about 133 persons to the square mile, in 1901, 4,472,000. For descriptive geography, agriculture, manufactures, trade, &c, see our article on BRITAIN.

Civil History—Scotland was known to the Romans by the name of Caledonia, and according to Latin authors it was inhabited by over a score of barbarous tribes of hunters and shepherds, who were polygamists and idolaters, their religion being druidical, and their social condition so utterly unsettled that they were called robbers by their more civilized invaders. They were exceedingly brave and hardy, and fought with short spears, daggers, and shields. They dwelt in miserable huts, and disdained the use of clothes. In the latter half of the first century of our era Julius Agricola led a Roman army north of the Firths of Forth and Clyde, and after a desperate and protracted struggle with the natives succeeded in reaching as far as the Firth of Tay, his fleet meanwhile exploring the coasts. He could not, however, complete the conquest of the country, and retired behind a chain of forts which he had constructed between the Firths of Forth and Clyde. Several other attempts at conquest were subsequently made, the most notable being that of Septimius Severus, at the head of an expedition which penetrated in 207 as far as the Moray Firth. A treaty of peace was con-

cluded with the Caledonians, but no sooner was the Roman army withdrawn than the natives rose in insurrection. The emperor was organizing a force for their complete subjugation when he was interrupted by death at Eboracum (York) in 211. During his residence in the island Severus rebuilt the wall between the Tyne and the Solway, originally erected by Hadrian, and on the final abandonment of Britain by the Romans in 446 they repaired this rampart, and that between the Forth and the Clyde. From this date and for some centuries later the predominant race of Scotland is known in history as the Picts (See PICTS). The country of the Picts extended from the Firth of Forth along the sea coast to the Pentland Firth, it was bounded on the west by the country of the Scots, which extended along the western coast to the modern county of Ross. The Scots were a Celtic people from Ireland, who, under their leader Fergus, succeeded in establishing themselves in Argyre about 503, and quickly extended their dominion northward. This people had been converted to Christianity by St. Patrick, and their chief is said to have received the blessing of the saint himself in early life. The country of the Picts was bounded on the south by the Firth of Forth and the province of Lodonia (Lothian), then in possession of the English, whilst the country of the Scots had its southern boundary in the Firth of Clyde and the kingdom of Cumbria, the territory of the independent Britons.

The reign of Fergus the Scot lasted only three years, that of his son Domangart five. The two sons of the latter, Comgal and Gonran, reigned successively, the first for thirty two and the second for twenty two years. It was the fate of Gonran to enter into hostilities with the Picts, an event that must sooner or later have occurred between such neighbours, and of which this seems to have been the commencement, and in the battle that ensued between him and Brude I he was defeated and slain. He was succeeded by Conal, son of his brother Comgal, to the prejudice of his own family, and thus was laid the groundwork of a war of succession, that produced years of confusion and bloodshed. In this reign Columba began the conversion of the northern Picts, Iona being given to him by Conal for the use of the mission. His nephew Aidan laid claim to the throne, and successfully sustained it by force of arms. Aidan proved a powerful and energetic prince, and invaded successfully the English territory several times, but towards the end of his reign he suffered a severe defeat from Ethelfrid of Northumbria at Degsaetan. After Aidan a line of kings succeeded, whose obscure and contradictory history, even if it could be effectually cleared up, would scarcely recompense the trouble. With the more powerful Pictish kings, as well as with the Britons of Cumbria, the Scots were engaged in almost incessant conflict. They seem to have been for some time under a sort of subjection to the Northumbrian princes, but regained their independence on the defeat and death of King Egric, in battle with the Picts at Nechtans mere in 685. About the beginning of the ninth century we find the Scots making rapid progress in civilization and population, while their neighbours the Picts were weakened by civil strife, occasioned by rival claims to the throne. Kenneth, the son of Alpin, succeeded on the defeat and death of his father in battle against the Picts in 836, to the Scottish throne. Some years later he laid claim to the Pictish crown, as the rightful heir in the female line, quickly overthrew the feeble Wred, the last of the Pictish kings, and stepped into his room in the year 843.

Kenneth MacAlpin, after feeling himself firmly seated on the throne of the now united kingdoms of

the Scots and Picts, turned his arms against England, invading Lothian, then still belonging to that country, six times, and burning Dunbar and Melrose. He was also called upon to resist the inroads of the Norse pirates, under the terrible Ragnar Lodbrog, who penetrated through the country as far as Clunie and Dunkeld. In addition to those enemies he had the Britons of Cumbria, who, alarmed perhaps at the growing power of their now formidable neighbour, invaded his territory and burned Dunblane. He appears to have held his own against his numerous enemies during his eventful reign of sixteen years. He removed the palladium of the Scots, their stone of destiny, from Argyle to Scone, transferred the royal residence to Forteviot in Strathernie, which had been the Pictish capital, and removed the venerated relics of St Columba from Iona to Dunkeld, where he built a church, and which he erected into the ecclesiastical capital of his kingdom.

Kenneth MacAlpin was succeeded by his brother Donald III, according to one set of chroniclers a feeble ruler and unprincipled epicure, and to others a brave and enterprising prince, who, after a reign of five years spent in wars against the English of Northumbria, died, and was succeeded by his nephew Constantine II, eldest son of Kenneth MacAlpin, in 863. The accession of this prince occurred at a calamitous period in Scottish history. The Danish pirates having secured a footing on the shores of Ireland after half a century of conflict, turned their attention now to Scotland. From Dublin, their chief harbour, successive fleets of these Ostmen, as the Danes of Ireland were called, entered the Firths of Clyde, Forth, Tay, Moray Firth, &c., wherever plunder could most abundantly be found, and during the interval from 866 to 881 a series of these disastrous visits had occurred, in which the whole of the coast of North Britain was ravaged with merciless thoroughness. Constantine met the Danes on several occasions with more or less success, until he was defeated and slain in the decisive battle of Crail in 881. He was succeeded by his brother Aodh or Hugh, who was killed after a reign of one year by his rebellious subject, Grig (Latinized by the monkish chroniclers into Gregorius), a mararmor or earl of the district between the Spey and the Dee. The monks of St Andrews, to whom he was very liberal, bestowed upon him the title of the Great, and represent him as the conqueror of the Britons, Irish, English, and Danes, as the very Arthur of Scottish history. He was expelled in 893, and was succeeded by a scion of the old family, named Donald IV, who fell in the moment of victory fighting against the Danes from Ireland, who had pushed in through the country to the walls of its capital, Forteviot, in 904. To him succeeded Constantine III, son of the Aodh above mentioned.

The reign of Constantine III was chiefly signalized by the Danish invasions, which still continued to be the principal events of English and Scottish history. In the eighteenth year of his reign the invaders sailed up the Clyde in great force, but were met at Timmore by the Scottish king at the head of a powerful army of his own subjects, strongly reinforced by the Anglo-Danes from the Danclagh of Northumberland. The battle lasted a whole day, and the Danes were compelled to retire after an obstinate struggle, and many years elapsed before they repeated their hostile visits to Scotland. This alliance with the Northumbrian Danes brought down upon Constantine the vengeance of Athelstane, king of England, who at the head of a powerful army overran the Scottish territory, without, however, as far as we can learn, having succeeded in bringing the Scots to any important engagement. Constantine

now entered into an alliance with the Danish king of Dublin and Northumbria, Owen, prince of Cumberland, and numerous Danish and Norwegian princes and jarls. In 937 the allies, conveyed in a fleet of 615 ships, entered the Humber, and disembarked at Brunanburgh, where they were encountered by Athelstane. In the battle that ensued, the first of a series of unfortunate combats by Scottish princes in England, and perhaps the greatest which had been until then fought upon English soil, the allies were defeated, five Danish vikings, four northern jarls, and the son of Constantine were slain. Weary of conflict the Scottish king laid aside his crown for a monk's cowl, retired to the monastery of St Andrews, and there became a Culdee abbot, dying in 953. He was succeeded in the royal dignity in 943 by Malcolm I, son of Donald IV. It seems highly probable that in the time of Constantine the ecclesiastical primacy was transferred from Dunkeld to St Andrews, and the royal residence to Scone. At the latter place, in the sixth year of his reign, the king, Kelach, the bishop, and the Scots swore to observe the laws and discipline of the faith, and the rights of the churches and the gospels, which appears to indicate the meeting of a sort of council of a combined ecclesiastical and civil nature, according to the form that obtained both among the Celtic and Teutonic nations of this period.

No sooner was Malcolm I seated on the throne than a rebellion broke out, headed by the Maarmor of Moray, which was, however, quickly suppressed and its leader slain. During this reign a part of the Kingdom of Cumbria, comprising the modern Cumberland and the northern part of Westmoreland, which had been wrested from the Britons by Edmund, king of England, was bestowed by that prince on the Scottish king upon the condition of his defending the north part of the island against the incursions of the Danes. On this grant was founded the claim of homage made by the English kings upon those of Scotland, which in later times formed the cause or pretext of the protracted struggle between the sister kingdoms. In the reign of Kenneth, Malcolm's successor, the Scottish territories were still further increased by the cession of Lothian by Edgar of England, and by the conquest of the British kingdom of North Cumbria, or Strath Clyde. The last addition to the south of Scotland was made in the reign of Malcolm II (1005-34), son of Kenneth, to whom the Earl of Northumberland ceded the Merse and Teviotdale, thus extending Scotland on the east coast as far as the Tweed. Malcolm was succeeded by his grandson Duncan, a prince far too weak for the times. He was assassinated at Bothgowanan ('the smith's dwelling'), near Elgin, by men acting under the instructions of his cousin Macbeth, in the year 1040. The reign of Macbeth, though that of a usurper, was a beneficent one, and all the old chronicles are filled with descriptions of the peace and prosperity of Scotland during the greater part of his rule. The people were, indeed, so satisfied with their sovereign that they made no movement on behalf of the family of Duncan, so that the aid by which they were restored was derived from aliens and enemies. Backed by an army furnished by his uncle, Siward, earl of Northumberland, Malcolm, the eldest son of Duncan, marched into Scotland, and after a series of battles Macbeth was defeated and slain at Lumphanan, in Aberdeenshire, in 1057. See MACBETH.

The reign of Malcolm III, surnamed by his Celtic subjects Canmore or Cean-mohr ('Large Head'), was long and prosperous. His great natural talents had been improved by his education at the court of Edward the Confessor. The conquest of England by William of Normandy involved Malcolm in many a serious

struggle Edgar Atheling, the heir of the Saxon line, and many of the Saxon nobles, sought and found refuge in Scotland. Malcolm married Margaret, the sister of the fugitive prince, who is said to have introduced into her court a degree of refinement remarkable for that time, and to have contributed in many ways to soften the rude manners of the people. The Scotch king twice invaded England with success, but William, having collected a large army, in his turn advanced into Scotland, and compelled Malcolm to do homage for those lands which he held within what was accounted the English territory. Malcolm Canmore and his eldest son were slain in attempting to take Alnwick Castle in 1093, and Margaret survived only a few days.

On the death of Malcolm the Celtic tribes, attached to their old customs, disregarded the claims of Malcolm's remaining children, and placed his brother Donald Bane on the throne, but he was driven from it before he had reigned a year by Duncan, a natural son of the late king, who now seized the sceptre. In 1097, however, Edgar Atheling, obtained a force from the English king, and succeeded in gaining the kingdom for Edgar, the lawful son of Malcolm. After a short reign, distinguished by no remarkable event, Edgar was succeeded by his brother Alexander I., a prince whose reign is chiefly signalized by his severe administration of justice. A conspiracy against the king's life was baffled by the vigour of his measures. He assisted Henry I. of England in a war with the Welsh, and died in 1124, leaving the throne to his younger brother David.

The reign of this prince is one of the most remarkable in Scottish history. He soon found his power endangered by Malcolm MacHeth, the troublesome Mormor of Ross, who marched through the country as far as Stracathro, in Forfarshire. He was driven back, however, by the royal troops, and compelled to surrender, he was kept under restraint, and his lands were parcelled out among persons (several of whom were Norman strangers) who were to hold them as crown vassals. On the accession of the usurper Stephen to the English throne in 1135, to the prejudice of Maud or Matilda, only child of Henry I. and niece of David, the latter marched an army nearly up to the gates of Durham to enforce the claims of his kinswoman. Here the two kings met, and came to an arrangement in a curious shape, which has been explained by the supposition that, whatever he might give or take, David would not admit the title of Stephen. This family quarrel, combined with a growing hostility to the aggressive Normans, led to another invasion of England by David, at the head of what may be described as a countless horde of undisciplined savages rather than an organized army. They were met by a small band under the Norman barons of the north of England at Northallerton, and in the tumultuous combat that ensued, known in history as the battle of the Standard (1138), were completely defeated. But David was able to keep his unwieldy army on the English side of the border doing an infinity of mischief, and Stephen, owing to his other difficulties, had to take the position of the weaker party. At the treaty of Durham he acknowledged Henry, the son of the Scottish king, as Prince of Northumbria, and retained only the fortresses of Newcastle and Durham. The rest of his reign was spent in peace, and in successful endeavours to improve the moral, social, and ecclesiastical condition of the people. While yet Prince of Cumbria he had begun the establishment of the Glasgow bishopric. He adjusted the bishoprics of Dunkeld, Moray, Aberdeen, Ross, Caithness, Brechin, Dunblane, and Galloway. Among the religious houses for regulars, which in the same manner go back to his reign, are Holyrood in Edin-

burgh, Melrose, Jedburgh, Kelso, Dryburgh, Newbattle, and Kinloss. His services to the church procured for him canonization as a saint, but the endowments so taxed the royal domains and possessions that one of his successors bitterly characterized him as a 'sair sanct for the crown'. All along the eastern coast of his dominions were planted Norman, English, and Flemish colonies, which gradually penetrated into the interior (then occupied by the Celts), and established the language, literature, and manners of that Teutonic race which forms the population of the greater part of Scotland. David encouraged and secured the new institutions by introducing a system of written law, which gradually superseded the old Celtic traditional usages, and the first genuine collections of Scottish legislation thus belong to his reign. At his death in 1153 he was succeeded by his grandson Malcolm IV., a boy not quite twelve years old. This prince had both a feeble body and a weak mind, and his reign of twelve years is only remarkable for his giving up Northumbria to the English king.

On the death of Malcolm IV. in 1165 the crown fell to his younger brother William, who is known, for no very certain reason, by the title of William the Lion. Early in his reign he followed his cousin Henry of England in his foreign wars in the hope, probably, of his services being rewarded by the restitution of Northumbria. This was a favour Henry could not be induced to grant, and William flew to arms and in an unlucky moment invaded the disputed territory, devastating it in the fashion characteristic of these invasions, with fire and sword. One day he rode incautiously away too far from the main body of his army, and was captured by a band of Yorkshire barons, by whom he was handed over to the English king, then posted at Northampton. England was not deemed a safe enough place of custody for a prisoner so valuable, and he was removed to Falaise, in Normandy. There he was detained till December, 1174, when he consented to declare himself a vassal of England, and to do homage for his whole kingdom, and to admit English garrisons into the castles of Edinburgh, Stirling, Berwick, Jedburgh, and Roxburgh. Fortunately for Scotland she had never virtually to submit to compliance with the humiliating conditions of the treaty of Falaise. Almost immediately after the accession of Richard Coeur de Lion to the English throne he restored the position of the Scottish kingdom, by absolutely withdrawing what he had described as the conditions his father had extorted from William by new deeds and in consequence of his captivity. Richard took an obligation of 10,000 marks as the price of this discharge, a sum which would go to help him in his crusading expedition. William showed his gratitude for the restoration of his independence by continuing a faithful ally of England until his death in 1184.

His son and successor, Alexander II., a youth in his seventeenth year, took the side of the English barons in their struggle with King John, in the hope of recovering the Northumbrian and Anglo-Cumbrian provinces, and, indeed, the barons professed to put Alexander in possession of them. After much blood had been shed, and the border lands repeatedly devastated, Henry III. agreed in 1237 to give the King of Scots certain manors in Cumberland and Northumberland, not in sovereignty, but in feudal property. This was accepted, and a border line was laid down which has never since been altered to any considerable extent. The rest of Alexander's reign was spent in extending his authority more firmly over the territory north of the Moray Firth and in the Western Highlands. He died in 1249, in the small barren island of Kerrera, which fronts the bay

of Oban, while on an expedition to assert his feudal superiority over the ruler of Argyll and the Isles.

His son, Alexander III, a boy of eight years of age, was crowned with unusual pomp at Scone, 13th July, 1249. He had been betrothed when an infant to the Princess Margaret of England. Their nuptials were celebrated at York in 1251, and Alexander did homage to Henry for his English possessions. The latter demanded homage for his kingdom of Scotland also, but the young king replied that this affair, on which he had not consulted his proper advisers, was too important to be discussed on a festive occasion like the present. Nine years later we find the royal couple again at the English court, where a daughter, named Margaret, was born to them. Three years later there was a memorable invasion of Scotland by Haco, king of Norway, the concluding act in the career of the Norsemen or Danes in this kingdom. In the summer of 1263 Haco sailed from Bergen with a fleet of over 160 vessels, carrying a numerous army, for the purpose of recovering such of the Western Islands as had formerly belonged to his crown, but which had been wrested from it by the Scots. Passing round by the Orkneys he descended the west coast, levying heavy contributions wherever he touched, and at last cast anchor between Arran and the coast of Ayrshire. The winter was propitious to Scotland. Storm followed storm, breaking up the mighty fleet, by vessels running foul of each other, getting stranded or dashed against the rocky shores. One of these disasters brought a crisis. Some galleys were stranded near the village of Largs, and their crews on getting ashore met with a hostile reception. The fleet sent assistance, but fresh bands of the armed Scotch peasantry were quickly hurrying up, and at last Haco, resolving to do battle, landed a force. After a long and fierce struggle the Norwegians fled to their ships. The shattered remnant of the fleet had to work round the Mull of Cantyre, and then along the west coast, still tormented and suffering losses by foul weather, until they reached the Orkneys, where old King Haco died on the 12th Dec. 1263. In 1266 Magnus IV, the new king of Norway, by formal treaty ceded to the King of Scots Man and all the Western Islands, specially reserving Orkney and Shetland to the Norwegian crown. On the other hand, Alexander agreed to pay down a ransom for them of 1000 marks and an annual rent of 100 marks. For several years after this event Alexander was employed in maintaining the independence of the Scottish Church against the pretensions of the pope, and in restraining the encroachments of the clergy. His reign was a long and prosperous one, and his death was a serious calamity to Scotland. On the 19th March, 1286, as he was riding in the dusk along the coast of Fife, near the village of Kinghorn, his horse started or stumbled, and he was thrown over a precipice and killed on the spot. At this time Scotland was more civilized and more prosperous than at any period of her existence down to the time when she ceased to be a separate kingdom in 1707.

Alexander's children had all died before him. His daughter, Margaret, had married Eric, king of Norway, and died, leaving issue one daughter, Margaret, commonly called the Maiden of Norway, who was now the undoubted heiress of the crown, and was recognized as such by the Scots Estates about two years before the king's death. The same convention appointed a regency of six noblemen during the absence of the young queen. These regents acted for some time with wisdom and unanimity, but, two of them dying, dissensions arose among the remaining four, and Eric, apprehensive for the interests of his daughter, entered into communication

with Edward I of England, the result of which was a treaty for uniting the two kingdoms by the marriage of the Scottish queen to the eldest son of the King of England. But the unfortunate Maiden of Norway died at Orkney on her return to Scotland in September, 1290, and the nation was struck with grief and consternation in beholding the extinction of a line of sovereigns who had distinguished themselves for their bravery and wisdom, and in anticipating the miseries of a disputed succession. Thirteen claimants appeared for the crown, the more important of whom had estates in England as well as in Scotland, and were therefore vassals of the English king. Founding not only on this fact, but also on the fiction that he was Lord superior of Scotland, Edward called a meeting at Northampton for the purpose of settling the claims. Each claimant, before he could appeal, had to acknowledge Edward's overlordship. The line of succession reverted to the posterity of David, earl of Huntingdon, son of King David I. The earl had three daughters, Margaret, Isabella, and Ada. John Balliol was grandson of the oldest daughter, Robert Bruce son of the second, and John Hastings was the grandson of the third. As the claims of the other competitors were never seriously urged we pass them over in silence. In our days Balliol would have been undisputedly heir to the throne, but at that time the law of succession was not so clearly established. Balliol claimed the crown as being descended from the oldest daughter, Bruce pleaded that, though he was a descendant of the second daughter, yet, as being grandson to the earl, he had a superior claim to Balliol, who was only a great grandson, and Hastings alleged that the Kingdom of Scotland, like many other inheritances, was divisible, and that he had a title to a third. This latter claim was soon set aside, as the kingdom was declared impartible. The claims of Balliol and Bruce only had then to be dealt with. The great cause began in May, 1291, and did not close until November, 1292. As Edward had already filled the more important Scottish fortresses with English troops, according to a former arrangement with the rulers of the kingdom, he was heedless of giving offence to a defenceless people by his decision, and of course he chose the individual who would likely interfere least with his scheme of extending his dominion. The incapable and obsequious John Balliol was therefore declared King of Scotland, was crowned at Scone on the 30th November, and did homage to Edward for his kingdom at Newcastle on the 26th December, 1292. As if to convince the Scots beyond all manner of doubt that the ruins of government were held by the English king, and that their own prince was a mere puppet in Edward's hands, Balliol was frequently summoned to London on the most frivolous pretensions, and subjected to the most degrading insults. His position was not to be envied, he was looked upon by his friends as a simpleton, was hated by his new subjects for his mean spiritedness in sacrificing the independence of the nation, and his life was often in danger from the indignant Scots. On the outbreak of war between England and France the weak monarch was compelled by his nobles to enter into an offensive and defensive alliance with France, and to formally renounce his allegiance to Edward. The latter was engaged in suppressing a revolt of the Welsh when he heard of these events, and immediately ordered writs for the assembly of an army at Newcastle on 1st March, 1296. On the 28th Edward crossed the Tweed, and two days later stormed and took Berwick, the citizens of that then important commercial town being given up to indiscriminate slaughter. The fortresses of Dunbar, Roxburgh, Edinburgh, and Stirling were successfully

assailed in turn, and after marching north, probably as far as Elgin, he returned to Berwick to receive the homage of the Scotch bishops, barons, and knights, having 'conquered and searched the Kingdom of Scotland (as a contemporary writes) in twenty-one weeks without any more' Bahlol himself was committed to the Tower of London, but at the end of two years was liberated, and, retiring to his estates in France, relinquished for ever the contest for regal power. Edward had Scotland now completely in his power: he destroyed or took away all the public records, carried off the Stone of Destiny, the palladium of Scotland, which was enshrined in the throne at Scone on which the Scottish kings were wont to be crowned. Another potent relic also came into his possession—the celebrated Black Rood or Holy Rood—a certified piece of the true cross enshrined in gold or silver gilt. He spared no pains to obliterate every monument of the former independence of the kingdom, many castles were strengthened or rebuilt and garrisoned by English troops, and all those who had held important offices under Bahlol were removed, and their places filled with Englishmen. The unlimited exactions of Cressingham, the treasurer, and the rigour of Ormsby, the great justiciar, in demanding the oath of fealty, soon rendered them odious to the nobles, while the rapacity and barbarity of Edward's soldiers laid the wretched inhabitants open to every species of wrong and insult.

At this crisis, the popular hero of Scotland, Sir William Wallace, arose. He comes first on the scene as the cause and central figure in a scuffle which took place between his own countrymen and the English soldiery. The Scots are outnumbered, and must seek safety. The escape of Wallace is aided by his wife, who for this service is brutally slain. Wallace now vows eternal vengeance, and gathering a few daring hearts around him he falls upon the garrison in the night, burns their quarters, and kills some of them, among others William de Haselrig, whom Edward had made Earl of Clydesdale and Sheriff of Ayr. By degrees his followers largely increased, and they were emboldened to the flagrant audacity of making a raid on the great justiciar Ormsby while holding a court at Scone. Ormsby fled to England, and was followed by all the officers of state. Wallace now organized a great force in the Lowland counties north of the Tay, getting large accessions from Aberdeenshire. One by one the strongholds fell into his power, and their garrisons were put to the sword. Meanwhile a strong force under the Earl of Surrey and Cressingham advanced to Stirling to quell the insurrection. Wallace, who had been engaged in besieging the castle of Dundee, hastened to guard the passage of the Forth, and encamped in a strong position at Cambuskenneth. Early in the morning of the 11th September, 1297, the English army began to cross the Forth by a narrow bridge. About eleven o'clock, when Wallace thought a sufficient number of the enemy had crossed, he sent a body round to seize the head of the bridge, and then fell on the English troops with the bulk of his force. The result was a brilliant victory for the Scots. The obnoxious Cressingham was among the slain, many were drowned by being pressed into the river. Surrey had not crossed, but he felt the defeat so entire that he at once fled to Berwick, and the baggage of his army fell into the hands of the enemy. The castles which the English had still retained were immediately surrendered. Wallace, now invested with the title of Guardian of Scotland, in the name of King John marched his army into the north of England and laid waste the country from Carlisle to Newcastle. Edward was in Flanders when he received the news of Surrey's defeat. He at once issued orders

to all his forces in England and Wales to meet him at York. He marched into Scotland with an army too powerful for the Scots to resist. Wallace was forced into an engagement at Falkirk (22d July, 1298), and was completely defeated. Edward then made a tour over the whole kingdom, receiving wherever he came the submission of the nobles. He offered pardon to all except Wallace, upon whose head a large price was set. The patriot was captured near Glasgow by Alexander de Monteith, governor of Dumbarton Castle (who is said, without good reason, to have been his fellow countryman and old companion in arms), was carried to London in chains, and after a mock trial was barbarously executed, 23d August, 1305.

Wallace soon had a more fortunate, though not a more valiant, successor. Robert de Bruce, grandson of that Bruce who had been Bahlol's rival in the dispute concerning the Scottish crown, formed the design of rescuing the Scots from their degraded condition, and placing himself on the throne. He had long been an unwilling and restless retainer of Edward, and at last that monarch was apprised of his design, and one day at table dropped hints about Bruce being in imminent danger of his life. Bruce escaped about the beginning of February, 1306. He soon arrived in Scotland, met Comyn (whose treachery had informed the English monarch of the intended revolt) at Dumfries, and stabbed him in the church of the Gray Friars. Bruce quickly gained the support of the majority of the nobility of the kingdom, made himself master of nearly all the fortified places, and almost entirely liberated the country from its oppressors. He was crowned at Scone on the 27th March, 1306, but his successes were interrupted by the severe check he received from the English under Pembroke at Methven, near Perth, 19th June, and he was obliged to take shelter in the Western Isles. Provoked at the frequent revolts of the Scots, Edward, though old and broken in health, marched northwards at the head of such an army as would reduce Scotland to utter subjection and render revolt for a long period hopeless. He reached Bugh on the Sands, within sight of Scotland, and died there on the 7th July, 1307. Before he expired he enjoined on his son and successor, Edward II., to prosecute the war with Scotland, but the young king did not inherit his father's energy and ability. The English made two or three profitless invasions a short way over the border and then retreated. Bruce gained several successes over the troops which had been left to keep the country in subjection. He succeeded in so far animating his followers that, not content with having acquired possession of the greater part of his own kingdom, he marched into England and devastated several of the northern counties. A crisis came at last which roused the English government to a great effort. Edward Bruce, the brother of King Robert, had been besieging Stirling Castle, the last of the strongholds in the hands of the English. The governor, Philip de Mowbray, agreed to surrender it if not relieved before the 24th of June, 1314. Edward led into Scotland an army more powerful than had ever invaded that country. He came up to Bruce near Stirling, and on the 24th June was fought the great and decisive battle of Bannockburn which firmly established the independence of Scotland. Bruce was secured on the throne which he had so bravely won, and after a prosperous reign he died in 1329.

On the death of Robert Bruce his son, David II., a boy six years old, was proclaimed king, and acknowledged by the great part of the nation. Edward Bahlol, however, the son of John Bahlol (who died 1314) formed a party for the purpose of supporting his pretensions to the crown, he was backed by Edward

III of England, as sagacious and warlike a prince as his grandfather Edward I. Battles were frequent, and great cruelty was inflicted on both sides. At first Bahlol was successful, and on the 24th September, 1332, he was crowned king at Scone, but eventually David succeeded in driving him from the kingdom. Still, however, the war was carried on with England with increasing rancour till at length David was made prisoner at the battle of Neville's Cross, near Durham, on the 17th October, 1346. After being detained in captivity for eleven years he was ransomed for 100,000 marks. Returning to Scotland he died on the 22d February, 1371. As he left no heirs he was succeeded by Robert II, son of Walter, the high steward, and of Marjory Bruce, daughter of Robert I. The name of his family was Allan or Fitz Allan, but it had been habitual to call them by the name of the feudal office held by them in Scotland, and hence Robert II was the first of the Steward, or, as it came to be written, Stewart or Stuart, dynasty. He concluded a treaty with France, in which the nations mutually stipulated to assist and defend each other. In consequence of an article in this treaty Robert recalled such of his subjects as were serving in the English army—a measure which England regarded as a prelude to hostilities. War was soon commenced, but without any considerable advantage to either party, and without producing any material change in their relative situations. Robert died in 1390, and was succeeded by his son, John, who upon his accession took the name of Robert III. Scotland at this time was rent by the dissensions of its powerful barons and the feuds of hostile clans. The Earl of March withdrew his allegiance from the crown, and fled into England, the English refused to give him up, and after a ten years' truce another war was opened by a series of border forays. The southern counties of Scotland were ravaged by Percy, and Henry IV determined to signalize the early years of his reign by the entire subjugation of Scotland. At the head of a large army he proceeded as far as Edinburgh and laid siege to that fortress, but his badly organized army rapidly diminished by desertion, and he found it necessary to retire. In 1402 the Scots sent an army under Douglas to make reprisals on England, but they were met by the English under Percy (Hotspur) at Homildon Hill and completely routed. The latter part of the reign of Robert III was disturbed by the ambition of his brother, the Duke of Albany. That nobleman, under the pretence of a judicial act, caused the profligate young Duke of Rothesay, the heir to the throne, to be thrown into confinement at Falkland, where, it is said, he died of starvation. Afraid for the safety of his second son, James, Robert designed to send him to France. The young prince sailed from the North in March, 1405, but when off Flamborough Head his vessel was captured by an armed English vessel, and he was sent a prisoner to London. The misfortunes of his family hastened the king's death, which took place on the 4th April, 1406. James being then only eleven years of age, and a captive, the regency devolved on the Duke of Albany. The kingdom was torn with internal strife, the Celt and the Saxon were preparing for a final struggle for supremacy. The Highlanders under Donald of the Isles moved in great force down towards the Lowlands through the Northern Grampians. He descended into the plain from Benachne, and met the Lowlanders on a flat moor at Harlaw, about 18 miles north-west of Aberdeen, where he was signally defeated by a much inferior force of the Lowland gentry and burghers under the Earl of Mar, 24th July, 1411. About this time such was the wretched condition of the country that thousands of Scotchmen

repaired to France, where they entered the army, and gained much honour by their courage and discipline. At length, after nineteen years of captivity, and when he had reached the thirtieth year of his age, James was set at liberty. The excellent education bestowed on him in some measure compensated for the injustice of his capture and detention. It was desired on both sides that he should ally himself by marriage with the royal family of England, and it so happened that he had, in the spirit of pure romance, lost his heart to an unknown damsel, who turned out to be Joanna Beaufort, daughter of the Earl of Somerset and niece of King Henry V. The wedding was celebrated with great splendour, and the royal couple moved northwards at the head of a stately train. James I was crowned at Scone, 21st May, 1424.

His return makes a decided epoch in Scotch history. It becomes clear that a hand is now at work trained in the country of Doomsday Book and feudal precision, of common law and statute law. He kept his parliament busy, and statutes were passed in almost every year of his reign, there was a general survey and valuation of property for purposes of taxation. Weights and measures were regulated, and a standard of the coinage was established, so that it would be of like weight and fineness as the money of England. Neither did the king neglect any experience that might help him in improving the military organization of the country. The arms and armour of those liable to attend the feudal musters were rearranged, and 'wapenshawings' appointed. He noted the enormous value of the English bowmen in the field, and organized a system of parochial archery schools over the kingdom. It was not possible that a revolution so important could be accomplished to the satisfaction of everybody. The potent territorial lords were irritated at being compelled to show the charters or other titles by which they held their lands, and by a particular inquiry regarding what had become of all the property vested in the crown at the reign of Robert I. The ambitious and overbearing Murdoch, duke of Albany, late regent of the kingdom, and son of that Albany who had seized, and it is said starved to death, the Duke of Rothesay, was, together with his three sons, arrested and executed. Alexander of the Isles was compelled, after a severe struggle, to give himself up, and was thrown into prison. Dreading the ruin of their order the greater nobles at last formed a conspiracy for the murder of the king, which was carried out in the Blackfriars' Monastery at Perth on the night of the 20th February, 1437.

His son and successor James II being only seven years of age, the country was subjected to the miseries of a long and feeble regency. The chief events of the minority were the savage punishment of the late king's murderers, the attempts of Crichton, governor of Edinburgh Castle, and of his rival Livingston, governor of Stirling Castle, to increase their influence by obtaining possession of the infant king's person, the civil war stirred up by the powerful house of Douglas, which by its losses on the field, and eventually by the death of the Douglas himself by the king's own hand in 1452, was for the time overthrown. When at last the king did assume the reins of government he displayed a prudence and fortitude which inspired hopes of a prosperous reign. These hopes were unfortunately soon blasted by his being accidentally killed by the bursting of a cannon at the siege of Roxburgh Castle (3d August, 1460), from which the English garrison were eventually driven, and the fortress itself razed to the ground.

James III was a few days over nine years old when he succeeded to the kingdom, which was again subject

to all the troubles of a minority In 1469 the young king married Margaret, daughter of the Norse king Christian, and in the shape of a pledge of payment of her dowry the Orkney and Shetland Islands were given up to Scotland, of which they have ever since formed a part. It became painfully evident as the king grew up that he was of a pusillanimous and irresolute temper, he attached himself to persons of mean station and, for the most part, of contemptible abilities. He hated his nobles, and was in turn despised by them. Frequent quarrels and outbreaks were terminated by open rebellion, in which a party of the nobles had the influence to prevail on the king's own son to place himself at their head. The forces of the rebels were numerous, but those of the king were at least equal. They encountered each other at Sauchieburn, near Stirling. The king fled at the first onset, was thrown from his horse, carried into a miller's hut, and by a person who, pretending to be a priest, was brought in to confess him, he was treacherously murdered, 11th June, 1488.

James IV was sixteen years old when he ascended the throne, but the short minority seems to have been attended with few of the disorders which characterized those of his predecessors, and when he grasped the reins of power himself he enjoyed a degree of quiet and prosperity almost unknown to the former monarchs of Scotland. In 1503 he married Margaret, daughter of Henry VII of England, and thus paved the way for the future union of the two kingdoms. A peace, which in the treaty was vainly termed perpetual, was concluded with England. During the reign of Henry VII it did indeed remain unviolated, but such was the unfortunate predilection of the Scots towards a connection with France that during the early part of the reign of Henry VIII James was induced to espouse the French cause and to invade England. The undertaking proved fatal to himself and disastrous to his kingdom. He led the most numerous and best equipped army ever organized in Scotland into the northern counties of England, and was met by the English under Surrey at Flodden, where on the 9th September, 1513, his splendid army was completely routed. He fought in front himself, actuated by the spirit of a knight errant rather than by that of a general who had the fate of an army in his hands. He fell near the standard of the English commander, to whom he seems to have been hewing his way in the hope of a personal combat. The greater part of the nobles by whom he was accompanied shared his fate.

The king's death plunged the nation into a state of anarchy, his infant successor James V had not yet reached the age of two years. During the former minorities we have seen the nobles struggling to acquire a greater share of power than was consistent with the stability of the throne. Each of the Stuart kings was employed during the latter part of his reign in reducing that power which during the former part of it had become dangerous to the state. The minority of James V was, if possible, more turbulent than that of any of his predecessors. The nation was certainly spared the horrors of an invasion by the victorious army of Surrey, probably because the English had suffered more than their chroniclers have asserted, and the influence of the widowed queen prevented the continuation of hostilities. This, however, only afforded the nobles a better opportunity of quarrelling with each other. James's interest ought to have induced him to form, when he reached manhood, an alliance by marriage with England, but his attachment to France prevailed, and he married the daughter of the French king. This princess did not live long after her nup-

tials, and James espoused a princess of the same nation, the well known Mary of Guise. In many ways the king consulted the good of his subjects, and his institution of the Court of Session entitled him to the gratitude of the country, but his continued efforts to depress the nobility, though not inconsistent with the interests of his kingdom, embroiled him with that powerful body, and rendered almost his whole reign disastrous. In his seventeenth year the king, unable to brook the authority assumed by his guardian the Earl of Angus, escaped from his custody, and shortly afterwards Angus and his family were banished, and their lands forfeited. Henry VIII, having declared himself independent of the pope, wished James, his nephew, to follow his example, but this he would not do. Henry proposed a meeting at York, but after waiting there for six days he had to return, incensed at the insult the Scottish king had put upon him by his refusal of an interview. In 1542 the English made an incursion across the border, but were attacked and defeated with considerable loss by the Earls of Huntly and Home. To avenge this defeat Henry sent an army of 20,000 men under the Duke of Norfolk into Scotland. With great difficulty James got together an army of 30,000 men to oppose him. The spread of the doctrines of the Reformation had now begun to divide the kingdom, the nobles mostly siding with the reformers, while James adhered to the clergy. When the Scottish army had reached Falkland news arrived of Norfolk's retreat. The nobles refused to follow James into England, to the king's deep vexation. Yet he resolved to send a party of about 10,000 across the western border. There a strange fate befell them. The king had appointed one of his favourites, a certain Oliver Sinclair, to command the expedition, and it is said that this appointment gave umbrage to many. A small English force was hovering near, and on observing a favourable opportunity for attack they rushed upon their foes and utterly routed them. The king, who was then at Lochmaben, was struck to the heart by the disaster, and, having gone to Falkland in Fife, took to his bed. A broken spirit and infirm body reacted on each other, and he died on 16th December, 1542, having shortly before got news of the birth of a daughter, afterwards Mary Queen of Scots.

Again came the fatal conjunction of thirty years earlier—the death of a king, and a disastrous battle, and now the country was to be ruled in the name of an infant seven days old. But the disaster of Solway Moss, as the disgraceful rout was called, was of much less account than that of Flodden, the nation had not lost a generation of its leaders, and was sound at heart. The firmness of its constitution was at once shown by the machinery of government going straight on without check in the name of the infant. The Earl of Arran, as next heir to the throne, stepped into the regency as his hereditary right. The child remained at Lunithgow, where she was born, in charge of her mother, aided by a council. Henry VIII demanded the hand of the young Princess Mary in marriage for his son Edward, but Scotland was still true to her French sympathies, and his proposal was eventually rejected. War was immediately declared, and though the Scots suffered defeat at Pinkie (10th September, 1547)—the last great disaster in a contest for national existence—the object of the English king was not gained. In the following summer the child queen was sent to France, and in April, 1550, peace was proclaimed between England and Scotland. In 1554 Mary of Guise, or, as she is otherwise called, of Lorraine, succeeded in ousting the good natured and vacillating Earl of Arran from the regency. Through the influence of the powerful

family of the Guises Mary Stuart was married in 1558 to the dauphin, who in 1559 ascended the throne of France. For a short time the ablest statesmen in Scotland feared that their country would now become a mere province of France, but all fears on this head were set at rest by the death of the young king in 1560, and the return of his widowed consort to Scotland in August, 1561.

Mary had not only been well instructed in every branch of learning and polite accomplishment fashionable at that age, but was carefully brought up in the Roman Catholic faith, to which she remained sincerely attached all the days of her life. Unfortunately for her the Reformation had been accomplished in her kingdom during her absence, and the influence of the Presbyterians was in the ascendant. She saw at once that, in the beginning of her reign, it was hopeless to drive her people back into the old fold by open force, but she hoped that by a bold stroke she would strike at the root of the evil by talking over John Knox, the formidable head of the new church. A few days after her landing, therefore, she summoned the great reformer to her presence, and there is little doubt that she anticipated a triumph from her never failing blandishments and the fascination of her extraordinary beauty. She had seen little in France to prepare her for the rugged nature on whom she was to play her wit and allurements. Throughout the long interview her keen questions met with severe and often crushing replies, and it must have been clearly evident to her that she need expect no concession, that she must obey the Congregation, and that no toleration could be gained for Roman Catholicism. She wisely resigned herself to circumstances, appointed her natural brother, Lord James, whom she created Earl of Mar and subsequently Earl of Murray, her first minister. It would be difficult indeed to find in history a closer resemblance than her early government bore to a strong and deep-rooted moderate policy, holding in check the factious extremes of both sides. The country had become Protestant, and the members of the government were chosen from among that party, yet they desired to protect the queen herself in the exercise of her religion, and broke with the extreme clerical party headed by Knox. The chief military incidents of her early reign are a raid headed by Murray against the turbulent and plundering borderers, in which many of them were slain in fight and others executed, and the suppression of the revolt of the Catholic Earl of Huntly, the most powerful chief of the north. Huntly himself fell in battle in 1562 at Corrichie, about 16 miles west of Aberdeen, his son was arrested and executed, and the power of the house was broken.

Up to the year 1565 Mary's reign was popular and comparatively prosperous; her subjects were quiet, and showed a warm loyalty to their beautiful and brilliant queen, and her court was one of the most splendid in Europe. But darker days were fast approaching. The queen was surrounded by numerous importunate lovers, and suitors and wooers from almost every corner of Europe eagerly competed for such a prize. Arran, the heir of the house of Hamilton, and the nearest heir to the throne, the Earl of Leicester, the Count of Orleans, the Duke of Nemours, the Duke of Ferrara, the kings of Sweden, Denmark, and France, and above all Don Carlos, the heir to the extensive dominions of Spain—all sued for the hand of the beautiful Queen of Scots, and it seemed as if the Spaniard was to be successful. But a chance meeting with her handsome yet foolish and dissolute cousin Henry, Lord Darnley, destroyed all their hopes. The queen's heart was at once captivated with his fresh boyish face, and as steps to the rank

he was to be soon raised to he was created Lord of Ardmach and Earl of Ross. On the 29th July, 1565, the lovers were married, and for a time all went well. Murray was driven from the court, and the power of the Protestants was rudely shaken. An attempt at rebellion by Murray, Glencairn, Rothes, Kirkcaldy of Grange, and other lords of the Congregation, was easily thwarted, a Popish reaction seems to have spread over the country, and the government was strengthening daily. But the true character of Darnley at last became evident. His vanity, drunkenness, and lewdness became the matter of public talk, as also did the indignities he offered to the queen and the insults bestowed on her advisers. Within a year after the marriage the silly youth became, or was made jealous, of one of the queen's secretaries, an Italian named David Rizzio. At the head of several of the Scottish nobles who had become envious of the Italian's success, and disgusted with his ostentation, Darnley rushed into the queen's inner chamber, dragged the unfortunate secretary from his mistress's presence, and despatched him with their swords (9th March, 1566). This act must have destroyed all the remaining affection the queen had for her husband.

About this time the Earl of Bothwell, a man of the most unbounded greed and ambition, unguarded by any scruples, insinuated himself into Mary's favour, and the services which he had rendered her in weakening the influence of the Protestant nobles, joined to her resentment against her husband, seem to have driven her to adopt a mode of conduct which it is impossible to justify. Soon after the birth of the only child she ever had, and who afterwards ascended the throne as James VI., Darnley was murdered (10th February, 1567). Bothwell is known to have been the leading actor in the deed, and it was and is still believed by many that Mary herself was privy to the crime. Bothwell was brought to trial, but as he was now all powerful no one dared bring forth a particle of evidence, and he was accordingly acquitted. Emboldened by this Bothwell convened a number of the leading members of Parliament, and prevailed on them to sign a bond in which they not only declare him innocent of Darnley's death, but recommend him as the fittest party whom the queen could choose for a husband. This was quickly followed by a decisive stroke. On the 21st April, 1567, Mary went to Stirling to visit her child, and on her return was intercepted by Bothwell at the head of about 800 spearmen at Fountainbridge, a little to the west of the old town of Edinburgh. She was carried off with no show of resistance to his castle of Dunbar. A divorce was procured to free Bothwell from his wife, and his marriage with the queen took place on 15th May, 1567. The marriage was singularly unfortunate. So grossly did Bothwell use the woman who had sacrificed all for him that she was heard to pray for a knife to stab herself with rather than endure his ill treatment. The Scottish nobles and people were roused with indignation at her conduct. An army was speedily collected, and on the 12th June the leaders issued a proclamation avowing the cause of their taking arms to be the deliverance of the queen from the captivity of Bothwell, the preservation of the young prince, whose life was not safe, they asserted, from the treachery of his father's murderer, and the punishment of all those who took part in Darnley's assassination. Mary and Bothwell fled from Edinburgh first to Borthwick Castle and then to Dunbar, where they were able to collect a large force round them. When they fancied themselves strong enough to meet the insurgents they advanced upon Edinburgh, the castle of which town had come into possession of the confederate lords.

The latter did not wait to be attacked, but marched against the royal forces, and the two armies met on the 15th of June at Carberry Hill, about 7 miles from the capital. It soon became evident that the queen could not depend upon her followers, many of whom deserted to the enemy. She sought an interview with Kirkcaldy, who commanded an advanced party of the opposing forces, she could obtain no terms, and had to surrender unconditionally to the confederates. Bothwell fled from the field and sailed for the Orkneys, whither he was pursued by Kirkcaldy, but he succeeded in escaping to Denmark, where he was thrown into prison and died. Mary was conducted to Edinburgh amidst the reproaches of her subjects, and on the 16th June she was removed to Lochleven Castle, where she was placed in confinement under the charge of Lady Douglas, mother of the Earl of Murray. On the 24th July she was compelled to sign a document renouncing her crown in favour of her son, and appointing the Earl of Murray regent during the child's minority. After nearly a year's captivity, and notwithstanding the utmost degree of watchfulness, Mary made her escape from the castle, 2d May, 1568, and as a sort of reaction in her favour had set in among the nobility she was soon surrounded by an army. The queen and the regent now prepared for a struggle. The royal force was advancing from Hamilton to occupy Dumbarton Castle when it was met on the 13th May at Langside, near Glasgow, by an inferior force under Murray, and after less than an hour's fighting was completely routed. The queen fled frantically from the field, and to avoid falling into the hands of her enemies crossed over into England, resolved to seek the protection of her cousin Elizabeth. After nineteen years of weary captivity, relieved now and again by plots for escape and wild schemes for obtaining possession of the English crown through the co-operation of Elizabeth's subjects, Mary was convicted of conspiring against the life and government of the English queen, and was beheaded at Fotheringhay Castle, 8th February, 1587.

Murray held the regency of the kingdom, conducting its affairs with a wise and firm hand, till the 23rd January, 1570, when he was shot in the streets of Linlithgow by Hamilton of Bothwellhaugh. This deed is said to have been inspired by vengeance, Hamilton's wife having been expelled her house, subjected to the pitiless storm of a wintry night, and driven insane by the harshness of Murray's measures, but it has been satisfactorily proved that this story is without foundation. The Earls of Lennox, of Mar, and of Morton were regents in succession. In 1578 a party attached themselves to King James VI while yet a boy, and he assumed the reins of government. Means were taken to remove Morton, he was convicted of participating in the murder of Darnley, and was executed 2d June, 1581. In 1589 James sailed to Denmark, where he married Anne, daughter of Frederick II, in the sixteenth year of her age. The year 1600 was distinguished by the Gowrie conspiracy against the life or liberty of James (See GOWRIE CONSPIRACY). On the death of Elizabeth, 24th March, 1603, James succeeded to the English throne, with the title of James I at the age of thirty-seven. He ascended the English throne amidst the acclamations of his subjects, both Scots and English. An unusual calm fell upon his ancient kingdom. The spirit of the nobles seems to have been somewhat broken, or was, perhaps, turned to more distant views of ambition and other objects of pursuit. There were seven Scottish Parliaments called by James after his accession, wherein he presided by a commissioner. This was a new officer in the state, which a new situation of things demanded.

A law was passed in 1606 for the restitution of the estate of bishops, which the king said he had never intended to suppress. This restoration was followed by a great variety of laws for giving proper effect to the general principle. The estate of the bishops was not, however, restored to the people's confidence. There were many acts passed for promoting trade and commerce, and the nation about this time seems to have been seized with a mania for colonization, as many thousands of the inhabitants left their native land for the Irish province of Ulster, or the more distant shores of Nova Scotia. James VI died on the 27th March, 1625, and was succeeded by his son, Charles I, then in the 25th year of his age.

From the accession of James to the English crown till nearly the middle of the 15th century Scotland declined, not only in importance, but in wealth. Considered rather as an appendage of England than as a part of Britain, it enjoyed none of those advantages which its alliance with that kingdom seemed to promise. It had a Parliament of its own, indeed, but it was weak and servile, a merely nominal department of government. Neglected by its nobles, who attached themselves to the court of England, despised, sometimes oppressed, by its princes, who forgot that they owed to it their origin, Scotland became every day less considerable, till the reign of Anne, when it was, by a treaty between the two countries, declared to be an inseparable part of the kingdom of Great Britain, which was thenceforth to have one parliament. The period of time from the union of the crowns to the union of the kingdoms was characterized by civil wars and national revolutions.

The ten years of quiet which had concluded the last reign were followed by frequent perturbations. The king returned to Scotland after a long absence, in 1633, to be crowned, and to hold a Parliament. Among the many measures passed was an act bestowing on the crown those lands which the baronage had wrested from the church, a measure which could not fail to give great dissatisfaction to the greater territorial nobles. The Parliament had also the misfortune to make for itself enemies of the minor barons and burgesses. It continued an impost of the nature of an income tax, which had been granted some years before as a special temporary aid to the king's brother in law, the prince palatine. This tax was universally considered as an inquisitorial novelty, and the grumblers complained that it exposed their poverty to the world. About this time the favour which the Stuarts showed to the Episcopal Church to the prejudice of Presbyterianism brought the adherents of the National Church to a close union, and in 1637, when the new liturgy or service book, revised by Laud and called by his name, was ordered to be introduced into the churches without the consent of Parliament, disturbances broke out all over the kingdom. Numerous petitions against the use of the liturgy were poured in from all quarters. It soon became evident that the king would not give way, and that petition and remonstrance would be unavailing, and it became necessary to act with decision. A committee of sixteen members (four each from the four orders of barons, minor barons, burgesses, and clergy) was formed to act in the interests of the petitioners or supplicants as they were called, this committee, known under the name of the Tables, were appointed to give intelligence to all parts of the kingdom of all that passed betwixt the king, the Scottish council, and them, to correspond with the body of their constituents, and to receive intelligence from them, they were to treat with the council in the name of their constituents, and to reside constantly where the council sat. In February, 1636, Charles issued a proclamation taking

upon himself all the responsibilities of the innovations, and calling upon his loyal subjects to comply with his orders about the liturgy. To meet this the Tables urged the renewal of the Covenant (See COVENANT and COVENANTEES). Copies of the Covenant were circulated throughout the country, and were everywhere signed with the greatest enthusiasm. The king entered into negotiations with the Covenanters, and made large concessions, but it was clearly for the purpose of gaining the time necessary for organizing a force to crush disloyal subjects. The Earl of Montrose was sent north to subdue the prelatial city of Aberdeen, and to break the power of the Earl of Huntly, the most influential noble beyond the Forth, and who was favourable to the king. Fortune smiled upon the Covenanters, Aberdeen was occupied by a Covenanting army, and the Tables got possession of most of the royal fortresses in Scotland. In May, 1639, the Marquis of Hamilton disembarked a royal force at Leith, but it was so miserably weak that nothing could be attempted with it. On the other hand the Covenanters organized an efficient army of 22,000 infantry and 500 horse, which, under General Alexander Leslie, advanced towards the English border, 21st May. The king, at the head of his troops, marched northwards to meet them, but it was soon seen that his army would be unable to cope with the Scots. He consented to treat, and it was agreed that both armies should be disbanded, the royal fortresses restored to the king, and the matters in dispute referred to a free Parliament and General Assembly. The Assembly met in Glasgow in August, 1638, and repudiated the service book, re-constructed the church courts on a Presbyterian basis, and repealed the acts of previous Assemblies from 1606 downwards, and the Parliament of 1640 confirmed the proceedings of the Assembly, and adopted the Covenant as an act of their own, requiring all citizens, under civil penalties, to subscribe to it.

The Covenanters, however, still felt that they could not trust the king, and that all his concessions would be revoked when a favourable opportunity occurred. They accordingly entered into negotiations with France for aid in the struggle which they considered imminent. These negotiations came to the knowledge of the English court, and a Parliament was called to obtain supplies for conducting a war, but the Parliament was dissolved without granting anything. The king had recourse to ship-money and other means of extortion to raise the necessary supplies, and an ill appointed army, with little heart for its work, was at length set on foot. The Covenanters, on their part, reassembled their army, crossed the Tweed at Coldstream 20th August, 1640, defeated an English force at Newburn, and occupied New castle, Durham, Tynemouth, and Shields. As Charles now saw that the struggle was hopeless, he consented to treat. The Treaty of Ripon, concluded in 1641, confirmed the acts of the Scottish Parliament of 1640, and granted the invading army the sum of £300,000. In 1643 the English Parliament took and enjoined the Solemn League and Covenant in order to secure the assistance of the Scots in the civil war then going on. A Scottish army crossed the Tweed on the 19th February, 1644, took Newcastle, after a short siege, in February, and joining with the parliamentary army defeated the royalists at Marston Moor, near York, 2d July, 1644. Meanwhile the Earl of Montrose, who had gone over to the royalist party, was appointed commander of the royal forces in Scotland (forces he himself had to raise in the Highlands), and in a brilliant campaign gained the battles of Tippermuir (1644), Kilsyth, and Inverlochy (1645). A body of cavalry under David Leslie was despatched against him, which came up with

him at Philiphaugh, and destroyed his army at a blow (18th September, 1645). The affairs of the king becoming hopeless also in England, Charles gave himself up to the Scottish army posted before Newark 5th May, 1646, and was surrendered to the English Parliament 30th January, 1647, on payment of their arrears of pay. At Newport, in the Isle of Wight, the king entered into a secret engagement with the Scottish estates to become the covenanted sovereign of a Presbyterian people, and a badly organized army, under the Duke of Hamilton, was sent into England to effect his restoration. It was easily defeated by Cromwell at Preston, on the 17th August, 1648. Cromwell marched to Edinburgh, where he signed the Covenant, and stipulated for the exclusion from office of all persons accessory to the engagement with the king.

After the execution of Charles (30th January, 1649) the Scots proclaimed his son king, under the title of Charles II. The young king was then in Holland, and certain commissioners were sent over from Scotland to inform him that the governing body were willing to espouse his cause if he should take the Covenant with its companion testimonies, and engage to do his utmost to enforce the whole Covenanting system over England and Ireland. This Charles agreed to do, and he was invited over to his northern kingdom. He arrived in Scotland, landing at the mouth of the Spey, 3d July, 1650, and marched southward by Aberdeen, Dundee, and St Andrews to Falkland Palace. This royal progress alarmed the republican council of state at Whitehall, and a force under Cromwell was despatched to stop it. Cromwell crossed the Tweed with an army of 16,000 trained veterans on the 16th July. General David Leslie led the Scottish army, but he was hampered by the dangerous counsels of a crowd of zealous preachers, who accompanied his forces. After much skilful manoeuvring, and some skirmishing, Cromwell encamped at Dunbar, while Leslie occupied a much superior position on the Hill of Doon. This position he was compelled to surrender by the orders of the committee of the estates, and he marched down into the plain to meet the republican forces. After a fierce but short struggle the king's army was routed, and Cromwell gained possession of the open country south of the Forth (3d September). The Scots were, however, unwilling to abandon their king, he was crowned in great state at Scone, 1st January, 1651, and a new army was assembled. While Cromwell was pushing his way northward to Perth this army, finding the way into England open, made a silent and speedy march through the northern counties. But Cromwell was in hot pursuit, he came up with them on the 3d September, 1651 (the anniversary of Dunbar), at Worcester, and inflicted on the Scots another crushing defeat, taking Leslie, their commander, a prisoner.

The civil war was now at an end, the republicans were everywhere triumphant. Monk, one of Cromwell's lieutenants, was left in Scotland in command of 5000 men, a sufficient force to resist all hostile attacks now that the country was so drained of men. Dundee, which still held out for the royal cause, was stormed, its large garrison was put to the edge of the sword, the town was sacked and burned, and, according to a not very trustworthy legend, the inhabitants—men, women, and children—were miscellaneously slaughtered. Scotland was incorporated with England and Ireland, an ordinance was passed which was equivalent to an indemnity for offences, and a declaration of peace between England and Scotland, the General Assembly was suppressed, the Court of Session was superseded by a commission of justice, composed of English and Scotch judges, and the

royalist Argyle, the most powerful noble then in Scotland, submitted to the lord protector, and for some years history is dormant in Scotland. This somewhat gloomy quietness was disturbed by an affair known as Glencairn's expedition. Lord Glencairn applied to the exiled Charles (then in Paris) for a commission to command such a force as he might raise in Scotland. The request was readily granted by the careless king, and in August, 1653, Glencairn appeared in the West Highlands as the royal commander-in-chief. A detachment of the republican army accidentally stumbled upon the royalists at Lochgarry, and completely shattered them, and their leader and his followers submitted. Under the rule of the protector Scotland made great strides in material prosperity, manufactures and commerce flourished, and disorders were firmly suppressed, but yet the rule was stern, and to a great part of the country was obnoxious.

On the death of Cromwell the most superficial observer could see that the loyalty of the people to the Stuarts had revived, and in November, 1659, General Monk set out from Scotland on that march which resulted in the restoration of Charles II. The Scottish Parliament assembled under the Earl of Middleton, the king's commissioner, Jan. 1, 1661. Charles declared, through his commissioner, his resolution to maintain the true Protestant religion as it had been established during the reigns of his father and grand father, intimating, however, that he would restore the Episcopal government, though he allowed, meanwhile, the administration of sessions, presbyteries, and synods. This endeavour to establish Episcopacy was violently opposed, and led to the most cruel persecution of the Presbyterians, which lasted with more or less severity during the whole of the reign of Charles. Hundreds were executed on the scaffold, others were fined, imprisoned, and tortured, and whole tracts of the country were placed under a military despotism of the worst description. Driven to desperation, the extreme sections of the Presbyterian party had recourse to arms. Sharp, the primate of Scotland, was slain by a party headed by Balfour of Burley on Magnus Moor, in Wiltshire, on the 4th May, 1679, and on the 1st June (Sunday) the royal forces, under Graham of Claverhouse, were defeated by a force of Covenanters at Drumclog. Dissensions, however, broke out among the Covenanters' ranks, and at last the badly organized mass was attacked by Monmouth at Bothwell Bridge (22d June, 1679), and were signally defeated. But the spirits of the Covenanters were not subdued, and commissions were issued by the privy council to officers of the army, and even, it is said, to common soldiers, to put to death without trial, in presence of witnesses, all who would not recant or answer any questions that might be put to them. One of the most zealous and unscrupulous of the persecutors under this commission was Claverhouse, the vanquished leader at Drumclog. It must be remembered, however, that the ferocities of persecution were almost, if not altogether, limited to the small corner in the south-western portion of Scotland where the Cameronians, the most extreme party of the Covenanters, prevailed (See CAMERON (RICHARD) and REFORMED PRESBYTERIANS). There does not seem to have been much sympathy with these sufferers in other parts of the country. Such was the state of Scotland when the death of Charles II., on the 6th February, 1685, transferred the reins of government to the hands of his brother, James VII of Scotland and II of England.

James professed his intention to support the government, in church and state, as by law established, yet, without adverting to the experience of his father, he

was imprudent enough to attempt converting his subjects to the Catholic religion. He was encouraged in this course by the servility of the Scottish Parliament, which seemed willing to invest him with absolute power. Yet when he applied to that assembly for an indulgence to the Catholics the members, however complaisant as to their civil liberties, resolved to adhere to their religious principles. As the Parliament thus refused its concurrence, James had undisguised recourse to his prerogative for effecting an illegal change in the religious establishment. Universal discontent was the result of this measure. When the people of Scotland heard of the landing of the Prince of Orange early in November, 1688, and read his declaration in favour of liberty and in support of law, they hailed his advent with joy. The nobles began to intrigue, the populace, in their zeal, broke out into insurrection against the Catholics in Edinburgh. The Earl of Perth, the chancellor, a new convert to the Romish Church, imitating the pusillanimity and distraction of his master, now deserted his post, and the privy council, which was noted for its servility to the king and its harshness to the people, on this occasion made application to the Prince of Orange, to whom every one looked up as the deliverer of the land from Popish dominion. William consulted several of the Scottish nobles, clergy, and gentry regarding the state of their country, and issued circular letters summoning a convention at Edinburgh on the 22d March, 1689. In England, at the Revolution, it was of great importance to the security of the constitution and the quiet of the country that the two great parties into which the nation was divided were so equally balanced. In Scotland the members of the convention were all of one party, and were all actuated by a sense of recent wrongs. After a slight opposition they boldly decided that James II., by the abuse of his power, had forfeited the right to the throne, the decision of their English colleagues took the milder form that he had abandoned the throne. The Prince and Princess of Orange were then declared King and Queen of Scotland under the titles of William III and Mary II.

This act, which involved such mighty consequences, was attended by a statement of the grievances of the nation. The Presbyterian Church was now erected on the ruins of Episcopacy, the prerogative was restrained to its proper functions, yet the administration retained much of its ancient harshness, and much remained to be done for giving efficacy to law and affording safety to property and person. The reign of William III was marked by two events which rendered him generally unpopular in Scotland and strengthened the cause of the Jacobites, as the party who still adhered to James II was called. We allude to the massacre of Glencoe (see GLENCOE, MASSACRE OF) and the unfortunate Darien expedition (see DARIEN SCHEME), but the reign closed without any serious rising in Scotland.

The demise of William in 1702 transferred the crowns of the two nations to Queen Anne. She wrote to the Scottish privy councillors, authorizing them to continue their authority, and assuring them that she would support the established government. The same parliament which had established the Revolution continued to act on the accession of Anne, though not without protestations of its illegality. An act was passed for treating of a union with England, but was annulled in the following year. In 1703 the parliament refused to tolerate Episcopacy, and declined to concur in adopting the Protestant succession for the crown, it questioned the power of the queen to negative its bills, and issued a declaration which intimated a purpose, in case of the demise of the crown, to appoint a different sovereign from the English king.

Such were the movements which led to the appointment of commissioners to treat of a union between the sister kingdoms. The terms of the union were particularly obnoxious to the Scotch, and all ranks of people, however divided in other matters, joined issue against the detested treaty, which involved, as they believed, the loss of national independence, and imposed a great number of duties, customs, and restrictions upon a country to which they were before unknown. Addresses against it were presented from all quarters, and in several cases the populace rose in arms, and formed themselves into regiments of foot and horse in order to oppose the Union. Even the commercial section of the community, who were supposed to benefit so largely by it, were dissatisfied, and not without grounds, with the terms of the treaty. Before the Union the trade of Scotland had been open to the Levant, the Baltic, France, Spain, Portugal, Holland, and the Dutch plantations, and it seemed difficult to conceive how the commerce of the country could be advanced by laying restrictions on it to all those places, especially as the compensation allowed, namely, the privilege of trading with the English settlements and the plantations in America, was very trifling, the amount of the exports to these places at that time not being equal to the expense of defending them. Yet in spite of every opposition the Treaty of Union was ratified by a small majority of the Scottish and a large majority of the English Parliament, and on the 1st May, 1707, Scotland became united to England, the people looking on with sullen discontent, which was justified not only by the terms of the treaty, but by the notoriously corrupt manner in which the treaty was carried. An influx of English revenue officers now overspread the country, till then but slightly acquainted with the oppressive laws of revenue, and their severe exactions tended to keep up the resentment of the nation. On the 1st May, 1708, the Privy-council of Scotland was abolished, and one privy council was settled for the United Kingdom, the useful institution of justices of the peace was extended to Scotland, the circuit courts, which brought justice into every district, were regulated, the English laws of treason, much more savage and harsh than those of Scotland, were also extended to the latter country, but to balance this it was declared that no person accused of any crime should hereafter be subject to torture. In addition to this several important ecclesiastical measures were passed, though they were vehemently opposed by the church judicatories. Episcopal congregations were protected as legal, and it was declared that no forfeiture should be incurred in consequence of any ecclesiastical censure. The right of patronage was restored to those who were supposed to represent the original founders of the several churches. To give effect to all these measures a secretary of state for Scotland was appointed, who was found to be of less use than was at first conceived.

On the death of Queen Anne on the 1st August, 1714, the united crown was, in terms of the Act of Settlement, placed upon the head of George I. The early measures of the new reign were characterized by extreme violence, a course which brought on a rebellion in Scotland in 1715. This rising, headed by the Earl of Mar in favour of the Stuart cause, was quickly suppressed (See BRITAIN). Forfeitures followed in its train, and the jurisdictions which were thus transferred from the ancient proprietors, who had only used them for selfish purposes, were annexed to the crown. The spirits of men during these party conflicts were still intensely embittered, and the year 1718 was marked by the issue of a commission of vengeance when the

terrors of insurrection had ceased. Commissioners of Oyer and Terminer sat at Perth, Dundee, Cupar, and Kelso, to inquire into the treasons which had been committed in 1715. But the firmness of the grand juries in negating the presentments taught their rulers the wisdom of forbearance after justice had had her sacrifices. In the following year there was a landing on the western coast of Ross-shire of a few attainted nobles, but they made no progress. The Parliament in 1725 enacted that the Highlanders should be disarmed, and this was performed with mildness and discretion by General Wade. But insurgents of a different stamp soon occupied the attention of the government. The malt tax, which had occasioned during the late reign a motion in Parliament for the dissolution of the Union, was extended over Scotland during the present. The voice of every party in this country was now raised in reprobation of the hated impost. An insurrection broke out in Glasgow on the 21st June, 1725, in which the house of its representative in Parliament was sacked, and the king's troops were driven from the city. Every town and village seemed ready to imitate this example, and the king's servants began to see that the united claims of a whole people must be respected. They abolished the office of secretary of state for Scotland, and sent to that country as a confidential agent the Earl of Islay, a nobleman of uncommon address and talents, yet of little scrupulousness as to the means he used in effecting his object. General Wade, with Duncan Forbes, the king's advocate, marched with an army into Glasgow. The ringleaders of the outbreak were arrested, the magistrates of that city were carried prisoners to Edinburgh, where, however, they were not long detained. By dint of skilful management and perseverance the malt tax was enforced with some mitigations, but a proper respect was henceforth paid to the spirit of the people. The reign of the succeeding king, George II., is chiefly remarkable for the rebellion headed by Charles Edward Stuart, grandson of James VII. In August, 1745, he raised his standard at Glenfinnan, entered Perth, Edinburgh, Manchester, and Derby, within 100 miles of London, but was compelled to retreat before the superior forces rapidly mustered to oppose him. On the 16th April, 1746, his little army was shattered, and the hopes of his house irrevocably ruined on the field of Culloden. By the 20th George II. cap and heritable jurisdictions were finally abolished, and other acts were passed for giving full effect to that salutary measure. The fair value of these jurisdictions were settled by the Court of Session, and paid for by the public. By this means the poverty of the nobles was relieved, and the people were emancipated from their oppressive coercion. In 1755 the condition of Scotland attracted the attention of Pelham's administration, and from that period the benefits of the Union began to be universally felt. The forfeited estates, instead of being sold as formerly, were appropriated to objects of national improvement, and industry was promoted by every encouragement that could be given. The progress of industry and trade now became great. New manufactures were introduced with success, and the rapid cultivation of the country redoubled the produce and the value of the soil. Undoubtedly much is to be ascribed to the spirit and progressive state of the nation, but without the Union its unavailing efforts would have had to contend with the commercial jealousy of the English government, and would have been considerably depressed by its powerful influence. For the history of Scotland previous to the accession of David I. see Bede's *Historia Ecclesiastica*, the *Irish Annals*, the *Scottish Chronicles*,

published by Innes and Pinkerton, and in the series named the *Historians of Scotland* (10 vols., 1871-80), and the old English chroniclers. For the subsequent period down to the Reformation see the *Chronicles of Melrose and Lanercost*, the *Scotchchronicon of Fordun and Bower*, *Winton's Chronicle*, *Leslie's and Buchanan's Histories*, the *English Chronicles*, the *Exchequer Rolls of Scotland* and other Records publications, &c. For the following period, ending with the Union, see *Knox's*, *Calderwood's*, and *Spotiswood's Histories*, *Bailie's Letters*, *Woodrow's* and *Burnet's Histories*, the *State Papers*, &c. The chief modern authorities are *Innes's Critical Essay on the ancient History of Scotland*, *Pinkerton's Inquiry into the History of Scotland before 1056*, *Chalmers's Caledonia*, *Hailes's Annals*, *Skene's Celtic Scotland* (three vols., new edition, 1886), *Robertson's Scotland under her Early Kings* (two vols., 1862), the *Histories of Dr Robertson*, *Tytler*, *Laing*, *Burton* (eight vols., 1873), *Brown* (1898), and *A. Lang* (1900), *Mackintosh's History of Civilization in Scotland* (new edn., 1892), *Sir A. H. Dunbar's The Scottish Kings: A Revised Chronology* (1899), &c.

Ecclesiastical History.—We know nothing with certainty of the period when Christianity was introduced into Scotland, but there is little doubt that it was propagated from several different centres. One of the earliest established of these was that planted by St Ninian at Candida Casa or Whithorn, on the northern shore of the Solway Firth. The church built by him was founded about 397, and dedicated to St Martin of Tours, and his labours were directed to the conversion of the southern Picts, who are said to have abandoned their idolatry at his teaching and received the true faith, the whole of southern Scotland up to the Grampians thus becoming Christianized. At this time southern Scotland, along with the rest of southern Britain, was under the dominion of the Romans, who, however, withdrew from the island in 410, and a period of darkness regarding both religious and civil history follows. To this dark period is attributed the preaching of St Palladius in Scotland, but Skene finds no evidence that he was ever in the country. In 563 a most important event in the ecclesiastical history of Scotland took place, namely the arrival of St Columba from Ireland, and the founding of a monastery by him in the island of Iona, which for a long period afterwards was the chief centre of Christianity in Scotland. Under Columba the northern Picts were converted, and the southern Picts, who seem to have relapsed into idolatry, were reconverted, and monasteries were established both in the islands and in various parts of the mainland. After his death (in 597) the Iona monastery was acknowledged as the head of all the monasteries and churches established through his exertions, and his successors held a corresponding position as heads or primates of the church. A missionary contemporary with Columba was St Kentigern or Mungo, whose name is closely associated with Glasgow, and who appears to have been very successful in his missionary labours in south-western Scotland. In the seventh century the Columban Church was enabled to extend its teaching into Northumbria, and under King Oswald in 635 the Angles dwelling between the Tweed and the Forth were converted to Christianity. One of the most celebrated successors of Columba was Adamnan, his biographer (679-704). Having gone on an embassy to Northumbria, Adamnan found that the mode of observing Easter there differed from the old system to which he had been accustomed, and agreed with that of the church generally, and we are told that when he returned home he at-

tempted to bring those under him to conform to Rome, but found that they would not do so. After Adamnan's death this question of Easter gave rise to a schism in the Iona community, and in 717 Naiton, king of the Picts, who himself had conformed to Roman usage in this matter, expelled the Columban monks from his kingdom on account of their non-conformity.

It is not till after this time that we find mention of a name that has been fruitful in ecclesiastical controversy that, namely, of the Culdees. These have sometimes been regarded as a body of clergy or religious persons going back almost to the origin of Christianity in Scotland or it has been asserted that the Columban monks were so called, and they have also been looked upon as cherishing a pure type of Christianity in the midst of Romanist corruptions. These views appear, however, to be quite erroneous. The name seems to have originated in Ireland and to have been applied to hermits or anchorites, who were specially designated as *Deicolæ* or 'God worshippers,' in contrast to *Christi-colæ*, the name applied in a general sense to all Christians, and in a narrower application to monks leading a cenobitical life. Skene arrives at the conclusion 'that the Culdees (the form which the name took in Scotland) originally sprang from that ascetic order who adopted a solitary service of God in an isolated cell as the highest form of religious life, and who were termed *Deicolæ*, that they then became associated in communities of anchorites or hermits, that they were clerics, and might be called monks, but only in the sense in which anchorites were monks, that they made their appearance in the eastern districts of Scotland at the same time as the secular clergy were introduced, and succeeded the Columban monks who had been driven across the great mountain range of Drumalban, the western frontier of the Pictish kingdom, and that they were finally brought under the canonical rule along with the secular clergy, retaining, however, to some extent the nomenclature of the monastery, until at length the name of *Aelcleus*, or Culdee, became almost synonymous with that of secular canon.'

In the early church there were no territorial bishops, the episcopal functions being exercised by abbots or heads of monasteries. About the middle of the ninth century, however, the Abbot of Dunkeld was designated as the first bishop of Fortrenn, or the kingdom of the southern Picts. The 'Scottish Church' is first spoken of under that name in the reign of King Giric, or Grig (878-879), and in 908 the primacy was transferred to St Andrews, the first bishop of which received the title of Bishop of Alban. The marriage of Malcolm Canmore to the Saxon princess, Margaret, in 1069 had a great influence on the early Scottish Church, since the queen, who was deeply religious, did all in her power to make the church of her adopted country conform in all its rites and practices with those to which she had herself been accustomed. She began those changes which resulted 'in placing the church upon a territorial instead of a tribal basis, and substituting the parochial system and a diocesan episcopacy for the old tribal churches with their monastic jurisdiction and functional episcopacy, secondly, in introducing the religious orders of the Church of Rome, and founding great monasteries as centres of counter-influence to the native church, and thirdly, in absorbing the Culdees, now the only clerical element left in the Celtic Church, into the Roman system by converting them from secular into regular canons, and merging them in the latter order' (Skene).

David I, the son of Margaret, is distinguished as the great ecclesiastical reformer among all the Scot-

lish monarchs. While his brother, Alexander I, added the dioceses of Dunkeld and Moray to the one—St Andrews—already established, David restored the see of Glasgow, and founded those of Brechin, Dunblane, Caithness, Ross, and Aberdeen, besides founding a large number of the religious houses that were afterwards most prominent in Scotland.

The Scottish mediæval church when it had reached its full development differed in no important respect from that of England, the ritual and organization being practically the same, and the chief monastic orders of the rest of Christendom being also represented in Scotland. The earliest of those to establish themselves were the Benedictines, who were followed in the thirteenth century by the Dominicans, Franciscans, and Carmelites. The bishoprics for a long period numbered twelve, namely, St Andrews, Dunkeld, Moray, Glasgow, Galloway, Dunblane, Brechin, Aberdeen, Argyle, Ross, the Isles, Caithness, Orkney being added only in the fifteenth century when it became finally attached to the Scottish crown. Down to the same century, however, there was no archbishop in the Scottish hierarchy, though St Andrews possessed a certain precedence—but without any jurisdiction—over the other sees. The archbishops of York long laid claim to exercise metropolitan authority in Scotland, but the claim was not recognized, more especially as there was also on occasions a similar claim put forward by the archbishops of Canterbury. The popes even found it difficult to make themselves too absolute over the Scottish Church, the affairs of which were managed by synods, or ecclesiastical councils, consisting of the bishops, abbots, priors, deans, archdeacons, or other eminent ecclesiastics. In 1472, however, Sixtus IV raised St Andrews to the position of an archiepiscopal and metropolitan see, the other bishops being made suffragans to the Archbishop of St Andrews. Twenty years later Glasgow was also made a metropolitan see by Pope Innocent VIII, with several bishops as suffragans, and the two archbishops some times engaged in serious controversies regarding their respective rights and privileges till the Reformation stripped them both of their dignities.

For a lengthened period more than half the wealth of the nation was possessed by the clergy, and the greater part of this was in the hands of a few who ruled the rest. Bishops and abbots rivalled the first nobles in magnificence, and preceded them in honour, they were privy councillors and lords of session as well as of parliament, and the principal offices of state were for a long time wholly engrossed by them. The inferior benefices were openly put to sale, or bestowed on the minions of the bishops. Benefices given in *commendam* were kept vacant during the commendator's life, sometimes during several lives to the deprivation of extensive parishes of all provision of religious service. Besides the regular and secular clergy, there were nuns of St Austin, St Clare, St Scholastica and St Catharine of Siena, and canonesses of various orders, whose general ignorance was as great as their lives were luxurious. Though the Papal see had not the power of presenting to the Scottish prelates, it never wanted numerous pretences for interfering with them. The most important civil causes which they had contrived to bring within the pale of their ecclesiastical jurisdiction were carried to Rome, whither also large sums of money were sent for the purchase of palls, the confirmation of benefices, and the conducting of appeals, &c.

Scotland shared in all the errors of belief and superstitious practices in worship prevalent in the mediæval church, the ignorance and licentiousness of the clergy were ranker than in England, and the spiritual condition of the people was correspondingly

low. But the need for reformation, which had been seen by Huss and Wickliffe, also made its influence felt in Scotland. We learn from Walter Bower, the abbot of Inchcolm, the continuator of Fordun, that the opinions of Wickliffe were entertained and his books read by several Lollards in the kingdom, but in extreme secrecy. In 1408 James Reseby, an Englishman who had sought refuge in Scotland from persecution, was tried by an ecclesiastical council for forty heresies, and was handed over to the civil power to be burned at the stake, and in 1432 Paul Crawar, a German Hussite, was burned at St Andrews. The purer faith, however, continued to make way slowly and silently. Early in the following century the effects of Luther's teaching made their appearance in Scotland. By an act of Parliament in 1525 the teaching of Luther's doctrines and the importation of Lutheran books were forbidden, and a systematic persecution was resorted to. In 1528 a convicted heretic was burned at St Andrews. The victim was Patrick Hamilton, abbot of Fern, in Ross shire, who had imbibed the new tenets during his travels on the Continent from the conversation of Luther and Melancthon, and who is usually called the proto martyr, as he was the first native-born Scotsman who suffered for the Reformation opinions in the shape in which they gathered strength in Scotland. In 1538 Forrest, a Benedictine friar, and a disciple of Hamilton, was condemned to the stake, and in the following year the friars Keller and Beveridge, Sir Duncan Simpson, a regular priest, Robert Forrester, a gentleman of Stirling, and Thomas Forrest, vicar of Dollar, were condemned to death by a spiritual court headed by Beaton and held in Edinburgh, and were burned together in the same fire on the Castle Hill. Such violent proceedings alarmed the friends of the new faith, many saved themselves by voluntary exile, but others boldly remained behind, resolved to sow the good seed among their countrymen. The persecution, however, found many opponents of influence, both clerical and lay, and the nation gradually split up into two irreconcilable parties, one of which, including the higher ecclesiastics and the government, was determined to oppose all innovations, and the other, composed of a great number of the clergy, the gentry, and the well-to-do citizens of the towns, was desirous of bringing about a thorough reform of religion.

Under these circumstances a collision could not be long avoided. On the 28th February, 1546, George Wishart, the leading preacher among the reformers, was arrested for preaching at Haddington, was condemned to death by an ecclesiastical court presided over by Cardinal Beaton, archbishop of St Andrews, and was burned 28th March. On the 29th May the castle of St Andrews was captured by surprise by a small body of reformers headed by Norman Leslie, and the cardinal put to death. The struggle was carried out with varying success on both sides during the regency of Arran and of Mary of Lorraine, and this protraction operated in favour of the reformers, as it enabled them to show the timid and hesitating that they were able to hold their own against all the forces the government could bring against them. A considerable body of the gentry began to see that an ecclesiastical revolution would probably set free a great stretch of land for new owners. This made a common interest, which held them firmly together when they professed a union for purely religious objects. In the winter of 1557 many of them signed a band or bond to co-operate with each other at the risk of their power, substance, and lives to 'maintain, set forward, and establish the most blessed word of God and his congregation, to secure faithful ministers purely and truly to minister Christ's

evangel and sacraments to His people, to maintain them, nourish them, and defend them, the whole congregation of Christ and every member thereof, at our whole powers, and wearing of our lives, against Satan, and all wicked power that does intend tyranny or trouble against the aforesaid congregation.' This document, termed the First Covenant, is dated 3d December, 1557, and its subscribers called themselves the Lords of the Congregation. Both parties now prepared for a final struggle. The regent sought and obtained men and money from France, and the reformers were equally successful in procuring like support from England. The accession of Elizabeth to the English throne and the return of John Knox from Geneva seem to have infused fresh life into the reforming party. At the end of a twelvemonth the Congregation was triumphant.

The estates convened on August 1st, 1560. On the 17th the Confession of Faith, containing a rendering in English or Scots of the principles of the Geneva Church, was approved of as wholesome and sound doctrine, grounded upon the infallible truth of God's Word. At the same time there was a general repeal or revocation of all acts authorizing any other form of belief or worship, and the authority of the pope was abjured. It was also provided that administering or being present at the administration of the mass should be punishable in the first instance with forfeiture of goods and corporal infliction at the discretion of the magistrate, in the second with banishment, and in the third with death. A Book of Discipline was shortly afterwards drawn up by the compilers of the Confession (among them being John Knox), which, though it met with general approval, did not receive the sanction of Parliament. According to this Book everything savouring of popery was to be swept away entirely, not only the mass, but also invocation of saints, the keeping of saints' days and other days of man's appointment, such as Christmas, Epiphany, &c. Monasteries and all similar establishments were to be abolished. Ministers were to be elected by the respective congregations after proofs given in public of soundness, competence, and good moral character. Superintendents were also to be appointed, this office being designed for ministers pre eminent in standing and attainments, who, besides having charge of a single congregation, were to oversee the parishes of a whole district. Ministers were to be publicly admitted to the sacred office by other ministers and elders, but at first the imposition of hands was a ceremony not deemed necessary, and while the former were to assist the minister in spiritual things, and also exercise vigilance over him, the latter were to attend to the temporal affairs of the churches. The elders and deacons were to be chosen annually, and were not to be paid. The chief governing power in the church was intrusted to a General Assembly, composed of the superintendents, ministers, and lay commissioners. The public service of the church was to be conducted as set down in the manual known as The Book of Common Order, and was to be simple in character, consisting in preaching, prayers, the reading of portions of scripture, and the singing of psalms, in which alone the people took part directly. These reforms were by many considered too violent to be safe. There was a party that still favoured the episcopal form of church government, and it was powerful enough to bring about the appointment of a certain number of Protestant bishops elected from among the rest of the clergy. This scheme was, however, never popular, it was soon attacked by many of the ministers, headed by Andrew Melville, and by the great body of the people. The party of Melville gained the day, and what is known as the Second Book of

Discipline, containing his views as to ecclesiastical government, obtained the sanction of the General Assembly in 1578. Superintendents were now done away with and all ministers declared equal, no more bishops were to be appointed (See DISCIPLINE, BOOKS OF). It was only now that Presbyterianism in its stricter form was established in the country (see PRESBYTERIANS) but the Book of Discipline was never formally sanctioned by Parliament.

Although King James VI had accepted Presbyterianism, he cordially disliked the democratic theories upon which the system is founded. On his accession to the English throne he thought himself powerful enough to attempt the overthrow of the hated institution. Even before this (in 1600) he had secured the appointment of three bishops in addition to those still living, and gradually succeeded in gaining the restoration of the episcopal privileges. In 1610 Episcopacy was established by an act of the General Assembly at Glasgow. As an additional step in assimilating the Church of Scotland to that of England, James ordered to be introduced into the General Assembly in 1618, and succeeded in getting passed the measure called the Five Articles of Perth (See PERTH, FIVE ARTICLES OF). These changes were effected against the wish of large numbers of the people, especially in the southern counties, but with a little tact and conciliatory spirit the popular opposition might have been got over. James, however, was eager for further change, he resolved to force on the unwilling Presbyterians a prayer book like that of the English Church. This so thoroughly roused the Scottish subjects, that the king prudently gave way to the storm, and abandoned his scheme.

The measures of his son Charles I were equally unfavourable to the Scottish Church. He added another bishopric, that of Edinburgh, to the already existing dioceses, and endeavoured by his royal authority to introduce a Book of Canons and a liturgy compiled by Laud, on the models of those of England. The nature of the changes, and the manner in which they had been brought about, awoke the wrath of the Scots. The National Covenant was recast, and gladly subscribed by thousands of all ranks. An act of the General Assembly held at Glasgow in 1638 abolished the Five Articles of Perth, and Presbyterianism once more superseded Episcopacy. The acts of the Assembly were ratified by Parliament in 1640 (See COVENANTERS). Buoyed up by the hope of extending their own form of discipline over the English and Irish Churches, the Covenanters formed an alliance with the English Puritans now in arms against their king. The Solemn League and Covenant, after having been approved of by the General Assembly of Scotland, was signed by the General Assembly of Divines which the Parliament had convened at Westminster, and by the Parliament itself (1643). The ascendancy of the Independents, however, put an end to the triumph of Presbyterianism in England. After defeating the Scottish army at Dunbar Cromwell had Scotland at his mercy. He forbade the meeting of the General Assembly, but left the other courts and the rest of the ecclesiastical system just as they were. In 1662 the government of the church by bishops was restored by the royal prerogative, and in the same year was ratified by Parliament. Synods and presbyteries were allowed, and there was no attempt to reintroduce the liturgy or to enforce the Articles of Perth. The change seems to have been relished by the higher classes generally, and tolerated by the great bulk of the nation, except in the south-western counties, where a sanguinary persecution took place against those who resisted the government measures, espe-

dially after the assassination of the Scottish primate, Archbishop Sharp (See p 401 above) In 1689 prelacy was declared by a convention of estates to be a national grievance which ought to be abolished In spite of the opposition of the bishops, who adhered to King James, the presbyterian form of government was restored and established by Parliament, and the General Assembly met after having been discontinued since 1652, the Westminster Confession of Faith was ratified as the national standard of belief, and the right of patrons to nominate to benefices was withdrawn. At the union of England and Scotland in 1707, a special statute was passed which secured the presbyterian form of church government in the latter country

In 1712 an act was passed by Parliament which restored to patrons their right of presentation to church livings This gave rise to much discontent, and latterly led to the secession of various bodies from the Established Church The first secession (1733) was headed by Ebenezer Erskine, and the separate sect thus formed took the name of Associate Synod, though its members were better known under the name of Seceders (See UNITED PRESBYTERIANS) This was followed in 1761 by another secession, the separating body taking the name of the Presbytery of Relief The last and most important secession of all took place at the Disruption of 1843, when the Established Church lost about half her ministers and members (See FREE CHURCH) The obnoxious patronage act was modified by Lord Aberdeen's Act in 1843 (see PATRONAGE), and at last in 1874 patronage was finally abolished, the various congregations being allowed freedom to elect their own ministers Since then the church seems to have entered on a more healthy and vigorous life, and has greatly increased in numbers as well as in influence, while a spirit of increased liberality has conduced much to its prosperity A somewhat more elaborate service has been introduced into many congregations, church music has been greatly improved, hymns are now in much more common use, and in some cases even fixed forms of prayer are employed Many new congregations have been formed and new churches erected, the activity of the church in this direction being stimulated by the munificent gift of £500,000 conferred by Mr Baird in 1873, forming a fund administered for behalf of the church

The Church of Scotland has now 1389 parishes 154 mission churches and chapels of ease, and about 662,000 communicants (in 1900) Ecclesiastically the country is divided into 84 presbyteries and 16 synods The income of the church is derived (1) from the tithes, a charge representing a certain proportion of the annual produce or value of lands set apart for the payment of the stipends of the Established Church ministers and dating from pre-reformation times (see *Tithes*), (2) a sum of £17,040 paid by the exchequer from church property in the hands of the crown to a number of poor parishes and Highland churches, in addition to an annual gift of £2000 given by the king (who presides by a commissioner at the annual meeting of the General Assembly) to the Highland churches which have been weak since the time of the Disruption, (3) from private endowments, seat rents, and the liberality of the members The income of the church derived from the tithes, and including the annual value of manse and glebes, amounts to about £300,000 a year The total collections for the general purposes of the church in 1901 amounted to £515,432 An agitation on the part of a section of the other Presbyterian Churches in Scotland for the disestablishment and disendowment of the church has been alive for some years, but what the result of

this movement may be is impossible at present to foresee The relative numbers of the adherents belonging to the Established Church and other Presbyterian Churches are not known with certainty, but the church population is said to exceed that belonging to the other bodies united The Church of Scotland is also represented in England by a number of congregations, while a large number of churches in Canada, Guiana, and elsewhere are in connection with it It also carries on vigorous missionary operations in foreign parts

Adherents of Episcopacy have never ceased to exist in Scotland since the Reformation, and at present two bodies in Scotland represent this principle—the Scottish Episcopal Church and the R. Catholic Church The former is a small body in numbers (somewhat over 80,000 are said to belong to it), nor is it at all wealthy, though many of the nobility and gentry belong to it thus giving it perhaps more influence than it would otherwise possess There are seven bishops belonging to it, one of whom has the position of president under the title of Primus The Book of Common Prayer is used in the service of the church, but some congregations continue the use of the special Scottish communion office For its general adherence to the Stuarts, the Scottish Episcopal Church rested under rather severe penal laws till the end of the 18th century It is now in full communion with the Church of England The Roman Catholics form a more numerous body, their numbers amounting to nearly 340,000, about two thirds of whom belong to Glasgow, many being Irish or of Irish origin There are two archbishops and four bishops

The chief original authorities for the ecclesiastical history of Scotland are those mentioned at the end of the section of this article treating on civil history We may mention as modern authorities, Cook's History of the Reformation and History of the Church of Scotland, M'Crie's Life of John Knox and Life of Andrew Melville, Principal Cunningham's Church History of Scotland, Scott's Fasti Ecclesie Scotice, Professor Story's Church of Scotland, Past and Present, MacLachlan's Early Scottish Church, and especially Grub's Ecclesiastical History of Scotland (4 vols 1861)

Political Constitution—The ancient constitution of the Scottish government is involved in doubt and obscurity, and the respective limits of the royal power and that of the Highland chiefs and the barons seem to have been so various and uncertain as to render it probable that they were liable to the influence of accidental circumstances Much depended on the personal character of those in authority It was ever the policy of the wisest Scottish kings to restrict the authority of their nobles, and though the struggles thus occasioned were the cause of much misery and bloodshed, yet this course was rendered necessary by the dangerous ambition and ruthless tyranny of the nobles, who often threatened to overthrow the monarchy, and severely oppressed their vassals In the conflicts for power some of the kings perished by the hand of violence and many of the turbulent barons became the victims of their own conspiracies, or the treachery of others, and their order was thinned by proscriptions, assassinations, and judicial executions These internal commotions, however, ultimately freed the sovereigns from the overwhelming influence of the aristocracy, and restraining the spirit of feudal oppression made way for the introduction of order, just laws, and a more tranquil administration of government The Parliament of Scotland anciently comprised all who held any portion of land, however small, from the crown by tenure of military service, till the reign of James

VI., when the small barons or freeholders were excused from attendance in person, 'two or more wise men' being deputed from each county in proportion to its size. It regulated the periods of its meeting and adjournment, and the formation of committees to superintend the administration when the sessions were concluded. Its powers extended to the executive departments, as the appropriation of public money and the appointment of treasurers of the exchequer, the levying of troops and nomination of commanders, the sending of ambassadors to foreign states and the appointment of judges and officers of state. Parliament could restrain grants from the crown, or alienate portions of the royal demesne, and it assumed the right of bestowing pardons on criminals. The king did not possess even a negative authority over the proceedings of this assembly, without whose concurrence he could neither declare war, make peace, nor transact the most important affairs of the nation, and even so late as the reign of James IV the parliament pointed out to that monarch his duty as the first servant of the people. But the supreme power, though thus nominally resident in the parliament, was virtually in the king, who by his influence often entirely controlled its proceedings. The parliament in the whole consisted of three estates—the nobility, the dignified clergy (consisting of bishops, abbots, and priors), and the lesser barons, or representatives of shires and burghs. The spiritual lords, during the establishment of Episcopacy after the Reformation, were composed of bishops only. When Presbyterianism was formally ratified by law at the Revolution of 1689, the ecclesiastical estate ceased to have a place in parliament. The patronage of benefices gave the king a complete influence over the churchmen, whose numbers were equal to those of the lay nobles, and among the commons a majority might generally be found who were dependants of the sovereign. Every measure brought before parliament was previously prepared by a committee, styled the lords of the articles, chosen from each of the three orders, and these by the mode of their election were in effect little better than royal nominees. This institution seems to have been introduced gradually, and it is not certain when or in what manner it originated, but there are traces of the existence of such a committee as early as the beginning of the reign of James I. Before the Union there were four great officers of state—the lord high chancellor, the high treasurer, the lord privy seal, and the secretary, and there were also four lesser officers—the lord clerk register, the lord advocate, the treasurer depute, and the justice-clerk, all which officers, in virtue of their offices, had seats in the Scottish parliaments. Since the Union none of those officers are retained, except the lord privy seal, lord clerk register, lord advocate, and justice-clerk. The great officers of the crown were the lord high chamberlain, lord high-constable, lord high admiral, and lord marshal, the royal standard bearer, the lord justice-general, and the lord chief baron of the exchequer. There were besides many other officers both of the crown and state now extinct. The office of lyon king-at-arms, or grand herald of Scotland, is still retained. (See LYON KING-AT-ARMS.) Previously to the era of the Revolution the Privy-council of Scotland assumed inquisitorial powers, and even torture was administered under the sanction of its authority, but it is now entirely merged in the Privy-council of Great Britain. The number of peers in the Scottish Parliament was latterly 160, and of commons 155. The latter were divided into members or commissioners (as they were called) for shires and burghs, and all sat in one house, and voted promiscuously.

At the Union of the kingdoms the political system of Scotland was almost entirely incorporated with that of England. The representation allowed to Scotland was extremely small. It consisted for the House of Commons of forty-five members, fifteen from the burghs and thirty from the counties. The burghs, however, amounting by the ancient constitution to sixty-six, were divided into classes of four or five, one member being returned by the majority of each class. Edinburgh alone returned one member. The members were elected not by the inhabitants, as burgesses, but by the magistrates, who themselves were appointed chiefly by their predecessors in office, thus constituting close burghs, in which a party once obtaining a majority might retain it for any length of time, with little regard to the wishes of their fellow citizens. In county elections the right of voting was attached to the possession of lands held immediately of the crown, and of the valued rent of £400 Scots. But the feudal superiority which entitled to vote was separable from the actual possession of the property. The original proprietor, who perhaps had a number of these votes on his estate, might either sell or distribute them among his friends, so as to multiply his own elective influence. The freeholders of Scotland amounted to not quite 3000, of whom a certain number, for the reason stated, had no real property in land. The peers of Scotland are represented by sixteen of their number, elected by their own body at the commencement of each parliament. There are besides about thirty-five who are British peers, and who sit in their own personal right.

By the Reform Bill of 1832 the representatives of Scotland were increased to only fifty-three, notwithstanding the immense strides the country had made in wealth and political importance since the Union. The representatives were thirty for counties, and twenty-three for cities and burghs. The representatives for burghs were returned, not as formerly, by the town councils, but by every inhabitant paying rent to the value of £10 and upwards, and by proprietors to the same amount. By the Reform Act of 1868 the number of Scottish representatives was raised to sixty, thirty-two of whom were for the counties, twenty-six for cities and burghs, and two for the universities. By the Redistribution of Seats Act of 1885 the number of Scotch members was further increased to seventy-two, five seats being added to the burghs and seven to the counties, while by the Franchise Act of 1884 the qualifications for voters in burghs and counties were made uniform. For further particulars see the article BRITAIN.

Jurisprudence—The laws of Scotland are founded on a very ancient book, entitled the *Regiam Majestatem*. Regarding the authorship and age of this book there has been much dispute. Some assert it to have been compiled by order of David I. of Scotland, and others that it is little else than a transcript of the treatise on the Laws and Constitutions of England, attributed to Randolph de Glanville, chief-justice of England in the reign of Henry II. The *Regiam Majestatem* was the only written law of the kingdom, until James I. attempted to superadd the enactments of Parliament. These enactments, though ultimately the cause of superseding the *Regiam*, were formed on the model of that work. The law of Scotland strongly resembles that of England in regard to those branches which have either been created or greatly extended by the progress of modern civilization. Trial by jury in civil cases, and many of the most important parts of mercantile and maritime law, though differing much in form, are substantially English. The strong inclination of the legislature to extend this uniformity has been manifested in

many recent enactments, and more especially in that relating to the law of entail. In regard, however, to crimes, and to what are called heritable rights, relating chiefly to houses, lands, and things which may be considered accessory thereto, the Scotch and English codes continue essentially different. As to crimes, the penalties have almost, as a matter of course, been nearly assimilated, but the forms of procedure exhibit striking contrasts, and while unanimity is still required in English juries, those of Scotland may decide by a simple majority—a mode perhaps more rational, but certainly far less favourable to the accused. Scots law also allows a jury to return a verdict of not proven. In regard to heritable rights, the feudal law, with its numerous and perplexing formalities, long possessed, and though considerably modified by recent changes, still retains a greater ascendancy in Scotland than in England. If, in regard to these rights, Scotland has any title to boast of superiority, it is chiefly in her admirable system of records, by which all burdens affecting land can be accurately ascertained, so as to make either the purchase of land or the lending of money upon it as secure as any other investment. The Court of Session is the supreme civil court of Scotland, but wants one of the essential characteristics of *supreme*, properly so called, inasmuch as its decisions can be carried by appeal to the House of Lords (See SESSION, COURT OF). The Court of Justiciary, or criminal court, though composed only of judges of the Court of Session, is supreme in the highest sense, since its decisions in criminal cases are not subject to any review. The principal subordinate judicatories are sheriff courts, established in each county or stewartry. Sheriff-substitutes, or judges ordinary, one or more holding separate courts in different districts, decide in the first instance, subject to the review of the principal sheriff or sheriff depute, whose decisions, though final within the limits of his jurisdiction, are reviewable by the Court of Session, with the exception of classes of cases provided for by special statutes. The most important of these classes are those which come before the small debt court. In it the sum sued for must not exceed £12, and the sheriff's decision is final. Besides the sheriff-court, each county or district of a county has its justice of peace courts, in which judges, not stipendiary, decide on principles of equity in minor crimes, and, though very rarely, in small debts, and in every town of any importance are bailie, dean of guild, and police courts, with limited jurisdictions.

Education—When Scotland was first emancipated from the bondage of Popery Knox and his fellow reformers, in a spirit of the most enlightened philanthropy, proposed a distribution of the church funds which would have provided effectually for the education of all classes, and though baffled by the selfishness of the powerful territorial nobles, who had seized upon the funds, and were determined not to disgorge them, they did what in them lay, and established an endowed school in every parish. The foundation having been thus laid, the work was never abandoned, and the parochial school system proved so effectual that Scotchmen, wherever they went, distinguished themselves by intelligence, shrewdness, industry, and honesty, and, in regard at least to the lower and middle classes, were generally admitted to be the best educated people in Europe. The means of education, however, were unfortunately allowed to remain almost stationary, while population was advancing with remarkable rapidity, and hence, though the parochial system continued to be tolerably effective in rural parishes, it became almost powerless in large towns, and Scotland began to lose the highly creditable place which she had long held among the nations. To be sure, in the general

attention which popular education latterly attracted Scotland was not overlooked, and a happy rivalry was excited among the different religious bodies urging them to strenuous exertion in erecting schools. In this way, for some time before the passing of the Scotch Education Act of 1872, which made so considerable a change in the system of popular education, the evil had received a check, and since then it may be said to have been entirely extinguished. Scotland possesses, in addition to the board schools, which have superseded the old parish schools, grammar and high schools, and academies in every town of any size, the normal or training schools and the colleges of the different religious bodies, and the four universities of Edinburgh, Glasgow, Aberdeen, and St Andrews. See BRITAIN AND SCHOOLS.

People—All that portion of Scotland called the Lowlands may be described as being inhabited by that race to which the term Anglo Saxon is now generally applied (See ANGLO SAXONS). The Highland portion of the country, on the other hand, has as its leading inhabitants a nearly pure Celtic race, still retaining to a considerable extent their ancient language, and showing in their configuration and general character the peculiarities of that race (See GAEL AND HIGHLANDS OF SCOTLAND). A race, however, of nearly pure Norsemen, originally from Norway and Sweden, now constitute the majority of the inhabitants of the Orkney and Shetland Isles, and of a great many of the fishing villages of the northern and eastern counties, down even to the village of Newhaven on the Firth of Forth.

Language and Literature—As we have stated in the section of this article devoted to civil history, the Scots were originally Irish Celts who settled in the Western Highlands, and the phrase Scottish language ought to denote, and for a long time did denote, Gaelic or Erse or Ersh (that is, Irish), but the gradual subjugation by the Scottish kings of the Picts, the Britons of Cumbria, and the Angles of Lothian and the Merse led to the name Scottish being given to the language of the last of these. The Lowland Scotch dialects are forms of English as spoken by those northern members of the English race who became subjects of the King of the Scots. More particularly they are forms of the Northumbrian or northern English, which up to the war of Independence was spoken as one language from the Humber to the Forth, the Grampians and the Moray Firth. Since the final renunciation of attempts upon the independence of the kingdom, the language spoken in Scotland has had a history and culture of its own, has been influenced by legal institutions, an ecclesiastical system, a foreign connection, and a national life altogether distinct from those which have operated on the same language south of the Tweed. The Scottish language took little or nothing from the Celtic dialect spoken by the inhabitants of a great portion of the country; it had less of classic admixture than the old English, and so remained nearer to the character of the old Teutonic stock. Any glance taken over Scottish literature will therefore naturally exclude the productions of Celtic writers just as naturally as the literature of England passes by the lays of the Welsh bards. Whether the metrical tale of Sir Tristram, belonging to the Arthurian cycle of romance, was written by a Scotchman is a question which has been warmly discussed. The author to whom Scott and others trace it is Thomas of Erildoun, or, as he is otherwise called, the Rhymer. He had the fame not only of an epic poet or bard, but of a prophet, occupying in his own country somewhat of the position of Merlin in England. (See RHYMER—THOMAS THE). A brief lament for the death of Alexander III., preserved by Wyntoun, is generally supposed to be

one of the earliest specimens of Scottish poetry that have come down to us, but the first great Scottish poem we possess is *The Brus* (or *Bruce*), written by John Barbour (about 1316-96), archdeacon of Aberdeen, to celebrate the struggles and final victory of the heroic King Robert I. Barbour was a contemporary of Chaucer, and his poem is inferior to none in the English language at that period except those of the father of English poetry, and perhaps *Piers Plowman*, by Langlande. Somewhat later flourished Andrew Wyntoun, prior of the monastery of St Serf, on an island in Lochleven, who, in his *Orygynale Chronykil*, ambitiously attempted to write a metrical history of the world from the creation down to his own time. He has, however, given his own country so large a place in the general dispensation of human affairs that his work is virtually a chronicle of Scotland, burdened with a quantity of surplus matter easily removed from the part really valuable. About a century after Barbour comes Henry the Minstrel (wrote 1470-80), commonly called Blind Harry, who did for Wallace what his predecessor had done for Bruce. Another of the poets of this early period is no less a personage than King James I (1394-1437), author of the *King's Quair* (that is, *Quire* or *Book*), the subject of which is the royal poet's love for the Lady Joanna Beaufort, whom he eventually married. Two other poems of considerable length, and in a humorous style, have also been attributed to him—*Christis Kirk of the Grene* and *Pebbis to the Play*, but they are more probably the productions of his equally gifted and equally unfortunate descendant, James V. As for the two famous comic ballads of the *Gaberlunzie Man* and the *Jolly Beggar*, which it has been usual among recent writers to speak of as by one or other of these kings, there seems to be no reasonable ground, not even that of tradition of any antiquity, for assigning them to either. One of the earliest poets after James I is Robert Henryson, the author of the beautiful pastoral of *Robin and Makynne*, and a continuation or supplement to Chaucer's *Troilus and Creside*, which is commonly printed with the works of that poet under the title of the *Testament of Fair Creside*. All that is known of the era of Henryson is that he was alive and very old about the close of the fifteenth century. On reaching the sixteenth century we meet with the names of William Dunbar (died between 1520 and 1530), the author of *The Thrusill* and the *Ros* (*The Thistle and the Rose*), the *Goldyn Targe*, and many smaller poems, both serious and satirical, of very high merit, Gavin Douglas (1174-1522), bishop of Dunkeld, a son of the Earl of Angus, and who is famous for his translation of the *Æneid* (the first metrical version of any ancient classic that had yet appeared in the dialect of either kingdom), and for several original poems, some of an allegorical kind, Sir David Lindsay (1490-1554), whose satires powerfully assisted to expose the vices of the clergy. The first of the Scottish prose writers make their appearance in this century, among these are the anonymous author of the *Complaynt of Scotland*, and John Bellenden (died about 1550), archdeacon of Moray, who translated Boece's *Scotorum Historie* and the first five books of *Livy*. About a century and a half now elapses before we come upon the name of any eminent Scottish poet, most of the scholars of that period, such as Major and Buchanan, addressed themselves to the world at large and wrote in Latin. We have, however, a vernacular prose work of great merit, a *Historie of the Reformation of Religion within the Realme of Scotland*, by the leader of the movement, John Knox. It may be mentioned that, in more than one quarter, Knox was charged with corrupting the old language of his country, which he effected by modern

innovations. When put into a friendly shape, the import of the charge is that he strove to improve the language of his country as he reformed its religion, and it is a curious coincidence that Luther has the fame of reforming the language of Germany, and Calvin that of reforming the language of France. The introduction of southern English as the standard form of speech after the union of the crowns, and still more after the union of the Parliaments, gradually modified the characteristic language of Scotland, till most of its distinctive features disappeared, while a literary jargon was developed which was neither pure Scotch nor pure English, and which has been happily termed 'fancy' Scotch. The first notable poet who wrote in this mongrel dialect was Allan Ramsay (1686-1758), author of the delightful pastoral drama *The Gentle Shepherd*, and of numerous shorter pieces and songs. To this same age belongs also nearly the whole of that remarkable body of song known as the Jacobite minstrelsy, forming altogether as animated and powerful an expression of the popular feeling, in all its varieties of pathos, humour, indignation, and scorn, as has anywhere else been embodied in song. It is almost all unanimous, too, as if it had actually sprung from the general heart of the people, or formed itself spontaneously in the air of the land. The Scottish ballads, ever since the publication of Percy's *Reliques*, in which some of them were inserted, have engaged much attention, and especially since they have been more carefully collected and illustrated by Sir Walter Scott and other editors, have been generally held to constitute the chief glory of the popular minstrelsy of the country. With regard to their dates it is difficult to speak with anything like certainty, but it can scarcely be doubted that some of them are at least three or four centuries old, and many of them older than the seventeenth century. Some authorities, however, would assign the finest of them to a comparatively recent period—say the seventeenth century. See *The Romantic Ballads of Scotland*, by R. Chambers, who places the composition of most of them within the seventeenth century, and *The Lady Wardlaw Hersey*, by Norval Clyne, who claims for them a higher antiquity. The list of the more prominent successors of Ramsay is closed by the names of Fergusson, Burns, Hector Macneil, Scott, James Hogg, and Tannahill, while the vernacular prose writers may be said to be represented by John Galt, Hogg, Sir Walter Scott, George MacDonald, J. M. Barrie, S. R. Crockett, and others. For the Scotchmen who have won an honourable place in English literature we refer the reader to the article *ENGLAND*, section *Literature*.

Music.—Much conjectural matter has been written about the origin of Scotch music, discussing, among other questions, whether it was the creation of one of the artistic favourites of James III., or was brought over and naturalized by David Rizzio. That much of it is as old at least as the sixteenth century was proved by a manuscript collection of the tunes themselves in a handwriting and notation which brought them close back to that period. This collection, known as the *Skene Manuscript*, has had the fortune to be edited by a man of scholarly attainments who had devoted himself to musical study—William Dauncey, J. S. A. Scotland. His conclusions on their value as preserving the music of the country in its original purity are—'The favourable contrast which many of the Scotch airs therein contained present to the dull, tiresome, meretricious productions which from time to time have been palmed off upon the public under that name, and the vitiated copies of the same tunes which have been handed down by tradition alone, are the most gratifying results of its discovery. We are now no longer at a loss for a

standard by which we can test the genuineness of our national music, distinguishing the true from the false, the pure ore from all admixture of baser metal.' One of the most prominent features of the Scottish music is the prevalent omission of the fourth and seventh in the scale, and the consequent absence of all semitones, another is that the ascending sixth and seventh of the minor scale are not raised as in the model minor scale (see MUSIC—Example VI), but remain the same as the descending sixth and seventh. Modulation often takes place between the major key and its relative minor, and the melody keeps ever true to the diatonic scale of the principal key, no accidentals being introduced. Many airs open in the major key and close on the minor. Closes are not confined to the tonic, and are found on the third, fifth, and sixth, and in Highland music on the second of a major and the seventh of a minor key. See George Thomson's *Melodies of Scotland*, with Symphonies and Accompaniments, by Pleyel, Kozeluch, Haydn, Beethoven, Hummel, and Weber (six vols. Edinburgh, 1822–25), *The Songs of Scotland* (published in three vols. by Wood & Co., Edinburgh, and edited by G. F. Graham), and *The Songs of Scotland* (edited by Brown and Pitman, published by Boosey & Co., London).

SCOTT, DAVID, a Scottish painter of eccentric and imaginative genius, was born 10th October, 1806. His father was a landscape engraver, and brought him up to his own profession, but Scott had early determined to become a painter, and he began by drawing vignettes and frontispieces for books. In 1827 he formed an association with some artists, who founded the Life Academy for the study of the living model. The following year he attended Dr Munro's class of anatomy and visited the National Gallery and British Institution of London. At the same time he exhibited his first picture, *The Hope of Early Genius Dispelled by Death*. *The Combat of Fingal with the Spirit of Lodi*, *Sarpedon Carried by Sleep and Death*, *Monograms of Man*, and other works painted between 1828 and 1832 indicated the bent of his genius, but his efforts were unsuccessful in bringing his ideas to a language which could be read either by the general public or by the professed followers of art. Keenly feeling his disappointment Scott determined to go to Rome to correct his ideas of art by the study of the ancient masters. He set out in August, 1832, visited London, Paris, and Geneva, most of the art cities of Italy, and finally reached Rome. During his stay he made an anatomical collection of 137 studies from life in oil and chalk, and painted several original works, among which was one of his greatest efforts, *The Household Gods Destroyed*, but his inspiration seems to have been too much of a subjective character to be much affected by the study of other artists, and he appears to have returned from Rome after a two years' residence with no material change in his conceptions of art or his manner of embodying them. Great canvases were essential to Scott's conception of high art. *Lot and his Daughters Fleeing from the Cities of the Plain* was returned from the British Institution as too large, but he never appears to have yielded to practical difficulties, and he went on painting pictures of unusual size. In 1835 he exhibited four pictures in Edinburgh, in 1836 three, among which was a *Descent from the Cross*. In 1837 he sent only two pictures, being occupied with the illustrations of the *Ancient Mariner*, which won the approbation of Coleridge, although he confessed that Scott's conception of the poem was different from his own. In 1838 he again exhibited a full complement of pictures at the Edinburgh Academy. *Achilles Addressing the Manes of Patroclus* and *The*

Alchemist Lecturing on the Elixir of Life were painted during this year. In 1839 he contributed to *Blackwood's Magazine* a series of essays on Italian painters. In 1840 he exhibited his Roman picture, *The Household Gods Destroyed*, which he had retouched, and which he considered his masterpiece. It was altogether ideal, the figures being scarcely human. It quite failed in producing the effect he anticipated. In 1841 he exhibited *Queen Elizabeth at the Globe Theatre* and several other pictures. In 1842 he designed a competition cartoon of a fresco painting for the Houses of Parliament—*Drake on the Quarter deck—The Destruction of the Armada*, which was passed entirely unnoticed by the judges, a keen disappointment to him. He also exhibited what has generally been considered his greatest picture—*Vasco de Gama Encountering the Spirit of the Storm at the Cape*—which was subsequently purchased for the Trinity House at Leith. About this period also he executed forty remarkable illustrations for the *Pilgrim's Progress*. From 1844 to 1849 his pictures still continued to form one of the leading features of the Edinburgh exhibition. In 1846 he produced *Peter the Hermit Preaching the Crusade*, in 1847 *The Triumph of Love*, in 1848 *Queen Mary at the Place of Execution*. These are only specimens of his numerous works. His industry was indefatigable, his ambition of the most exalted kind, and his imagination, though somewhat sombre, was exuberant and poetical, but his art was never fully successful in passing from the ideal stage, and he never appears to have thoroughly mastered the practical requirements of an artistic interpretation of his conceptions. His whole career was thus an arduous struggle, not with absolute failure, but with a success far from adequate to his aspirations. His health, always delicate, gave way in his forty third year, and he died on the 5th of March, 1849. Although his works have never become widely known, at least out of Scotland, he has made a few ardent admirers, and some have believed that if he had lived he would have founded a new school.

SCOTT, or SCOT, MICHAEL, a mediæval Scottish scholar and man of science, wrongly identified by Sir Walter Scott with Sir Michael Scot of Balwearie, in Fifeshire, who was sent in 1290 to fetch the *Maid of Norway* to Scotland. He was born probably about 1175, and studied at the universities of Oxford, Paris, and Bologna. After a period in the service of Frederick II. at Palermo, he continued his studies at Toledo, where he learned Arabic. On leaving Toledo he again repaired to Sicily, where he was closely associated with the Emperor Frederick, to whom he was appointed astrologer. He took orders, and was appointed by Honorius III. to the archbishopric of Cashel in Ireland, but he declined the post. He was at Oxford in 1230, probably sent by Frederick to bring before the university the translations of Aristotle made by himself and others. He died, probably in Italy, not later than 1235. Scott was a scholar learned in the science of his time, but he has been transformed by legend into a magician. As such he is referred to by Dante (*Inferno*, Canto xx.) and Boccaccio (*Decameron*), and he plays a prominent part in the popular superstitions of the border districts of Scotland. Many works are attributed to him, of which the following have been printed: *Liber Physiognomiae Magistri Michaelis Scoti* (1477), a Latin translation of Aristotle's *De Animalibus* (1496), *Questio Curiosa de Natura Solis et Lunæ* (1622), on alchemy, and *Mensa Philosophica* (1602). Englished as *The Philosopher's Banquet* (1614). See J. W. Brown's *Life and Legend of Michael Scot* (1897), and Sir Walter Scott's notes to *Lay of the Last Minstrel*.

SCOTT, THOMAS, an eminent evangelical clergyman of the English Church, was the son of a farmer, and born in 1747 in Lincolnshire. After having acquired some acquaintance with classical learning he was at the age of sixteen apprenticed to a surgeon and apothecary at Alford, in his native county. In this situation he stayed only two months, and then, returning home, he was employed in his father's business. Having a strong inclination to enter into the church he applied himself closely to study, and obtained a considerable knowledge of both the Latin and Greek languages. In 1773 he was ordained. Becoming acquainted with the Rev John Newton, curate of Olney, he imbibed Calvinistic views, in the defence of which, both from the pulpit and the press, he greatly distinguished himself. In 1781 he removed to Olney, and in 1785 to London, having obtained the chaplainship of the Lock Chapel, near Hyde Park Corner. In 1801 he was appointed rector of Aston Sanford, in Buckinghamshire, where he died April 16, 1821. He published in 1779 a tract entitled *The Force of Truth* (8vo), which was followed by several single sermons and other works, but his principal productions are *A Defence of Calvinism*, against Bishop Tomline, and *A Commentary on the Bible* (six vols quarto). It is estimated that 100,000 copies of Scott's *Commentary* had been sold in England and America up to 1855.

SCOTT, SIR WALFORD, BART., a distinguished poet and novelist, was born in Edinburgh, August 15, 1771. He was a younger son of Walter Scott, writer to the signet, by Anne, daughter of Dr John Rutherford, professor of the practice of medicine in the University of Edinburgh. His father was a descendant of the baronial house of Harden, his mother also belonged to a Border family. His constitution was naturally strong, and he became a man of great muscular power, but he had to struggle early with disease, and before he was two years old his right leg was struck with paralysis, which left him lame for life. He was sent at a very early period of life to Sandy Knowe, in Roxburghshire, a farm occupied by his paternal grandfather, where he had ample opportunities of storing his mind with Border tradition. He also passed some time with a maiden aunt at Bath. He entered the high school of Edinburgh in 1778, and during a short residence at Kelso he attended school there, having for school fellows James and John Ballantyne, with whom he subsequently became intimately connected in business. In Nov 1783, having completed the curriculum at the high school, he was matriculated at the University of Edinburgh, studying Latin under Professor Hill, and Greek under Professor Dalzell. Another year under Dalzell, and a third in the logic class taught by Professor Bruce, appear to have formed the sum of his unprofessional studies at college. He frequently lamented his want of application to systematic study, and his knowledge of Latin and Greek was very slight, but he subsequently acquired a fair acquaintance with modern languages. He was much devoted at this period to light reading, and an illness, which interrupted his studies, in his sixteenth year, afforded him an unusually ample opportunity of gratifying this taste. He read, by his own confession, all the old romances, old plays, and epic poems contained in an extensive library, and afterwards extended his studies to histories, memoirs, voyages, and travels. On the restoration of his health he commenced in his father's office an apprenticeship to legal business, which was completed in July, 1792, by his entering at the Scottish bar. On the 24th December, 1797, he married a Miss Carpenter, or Charpentier, a young Frenchwoman of good parentage, whom he accidentally met at Gileland, in Cumber-

land, and who possessed a small annuity, and in 1799 he was appointed Sheriff of Selkirkshire, a situation to which an income of £300 was attached. In 1806 he became a principal clerk of the Court of Session, although by arrangement with his predecessor he did not receive the full emoluments of his office, about £1300, till the retiral of the latter in 1812.

The leisure hours of his early life as an advocate were devoted to the study of German, and the result was a translation of Bürger's *Lenore*, and Der wilde Jäger (*The Wild Huntsman*), which he published in a small quarto volume in 1796. The success of this attempt was by no means encouraging, yet he persevered in his German studies, and in 1799 gave to the world a translation of Goethe's *Goetz von Berlichingen*. Soon after he began the collection of ancient ballads, and in 1802 published in two volumes 8vo the *Minstrelsy of the Scottish Border*. In the ensuing year he added a third volume, consisting chiefly of original ballads by himself and others. The work was, upon the whole, a pleasing mélange of history, poetry, and tradition, and it gained the author a considerable reputation, though not that of an original poet in any eminent degree. In 1804 he published with annotations the ancient romance of Sir *Tristrem*.

It was not till 1805 that he attracted decided attention as an original poet. In this year he gave to the world the *Lay of the Last Minstrel*, an extended specimen of the ballad style, which fell upon the public as something entirely new. In 1808 Scott published *Marmion*, which greatly increased his reputation. While the *Minstrel* had produced him £760, the present work secured one thousand guineas. In the same year he published an edition of Dryden's works, with notes, and a life of that poet. In 1809 he edited the state papers and letters of Sir Ralph Sadler, and soon after he became a contributor to the *Edinburgh Annual Register* started by Mr Southey. *The Lady of the Lake*, in which his poetical genius seems to have reached the acme of its powers, was published in 1810. His earlier efforts were less matured and refined, and the later are all, in various degrees, less spirited and effective. In 1811 appeared *Don Roderick*, a dreamy vaticination of modern Spanish history. In 1813 he published *Rokeby*, in which he attempted to invest English scenery, and a tale of the civil war, with the charm which he had already thrown over the Scottish Highlands and Borders, and their romantic inhabitants. *Rokeby* was followed, in 1814, by the *Lord of the Isles*, which was much inferior to its predecessor, and owing to the appearance of Byron the popularity of Scott's poetry had begun to decline. As if to try how far his name now operated in promoting the sale of his writings, he produced, anonymously, two small poems in succession, *Harold the Dauntless*, and *The Bridal of Triermain*. Neither made any considerable impression upon the public, and he, therefore, seems to have concluded that poetry was no longer a line in which he ought to exercise his talents.

The appearance of the prose romance of *Waverley*, in 1814, forms an epoch in modern literature as well as in the life of Scott. The circumstances which led him to attempt this new style of composition, and induced him for so long a period carefully to conceal his authorship, are detailed in his introduction to the new edition of his novels. Almost the only circumstances that gave rise to any serious doubt on the subject in well informed circles was the repeated and apparently explicit denials of the authorship by Scott himself.

While the Court of Session was sitting Scott lived in Edinburgh, in a good substantial house in North

Castle Street. During the vacations he resided in the country, and entered with ardour into the ordinary occupations and amusements of country gentlemen. After he was appointed Sheriff of Selkirk he hired for his summer residence the house and farm of Ashestiel, in a romantic situation on the banks of the Tweed, and here many of his poetical works were written. But with the increase of his resources grew the desire to possess landed property of his own, where he might indulge his taste for building, planting, and gardening. He purchased a small farm of about 100 acres, lying on the south bank of the Tweed, 3 miles above Melrose, upon which was a small and inconvenient farm house. Such was the nucleus of the mansion and estate of Abbotsford. By degrees, as his resources increased, he added farm after farm to his domain, and reared his chateau turret after turret, till he had completed what a French tourist not unaptly terms 'a romance in stone and lime,' clothing meanwhile the hills behind, and embowering the lawns before, with flourishing woods of his own planting. The desire of becoming an extensive landed proprietor was a passion which apparently glowed more warmly in his bosom than even the appetite for literary fame. It was now the principal spring of his actions to add as much as possible to the little realm of Abbotsford, in order that he might take his place—not among the great literary names which posterity is to revere, but among the country gentlemen of Roxburghshire. Under the influence of this passion Scott produced a rapid succession of novels, of which it will be sufficient here to state the names and dates.

To *Waverley* succeeded, in 1815, *Guy Mannering* and *The Antiquary*, in 1816 the *First Series* of the *Tales of my Landlord*, containing *The Black Dwarf* and *Old Mortality*, in 1817 *Rob Roy*, in 1818 the *Second Series* of the *Tales of my Landlord*, containing *The Heart of Mid Lothian*, and in 1819 the *Third Series* of the *Tales of my Landlord*, containing *The Bride of Lammermoor* and *A Legend of Montrose*. It is to be observed that the series called *Tales of my Landlord* were professedly by a different author from him of *Waverley*, an expedient which the real author had thought conducive to the maintenance of the public interest. Having now drawn upon public curiosity to the extent of twelve volumes in each of his two incognitos, he seems to have thought it necessary to adopt a third, and accordingly he intended *Ivanhoe*, which appeared in the end of 1819, to come forth as the first work of a new candidate for public favour. From this design he was diverted by a circumstance of trivial importance, the publication of a novel at London, pretending to be a fourth series of the *Tales of my Landlord*. It was therefore judged necessary that *Ivanhoe* should appear as a veritable production of the author of *Waverley*. To it succeeded, in the course of the following year, *The Monastery* and *The Abbot*. In the beginning of the year 1821 appeared *Kenilworth* making twelve volumes, if not written, at least published in as many months. In 1821, too, he produced *The Pirate*, and in 1822, *The Fortunes of Nigel*, in 1823 *Peveril of the Peak* (four volumes), *Quentin Durward*, and *St Ronan's Well*, in 1824 *Redgauntlet*, in 1825, *Tales of the Crusaders*, containing *The Betrothed* and *The Talisman* (four volumes), in 1826, *Woodstock*, in 1827, *Chronicles of the Canongate*, *First Series*, containing *The Two Drovers*, *The Highland Widow*, and *The Surgeon's Daughter* (two volumes), in 1828, *Chronicles of the Canongate*, *Second Series*, containing *The Fair Maid of Perth*, in 1829, *Anne of Geierstein*, and in 1832, *Tales of my Landlord*, *Fourth Series*, in four volumes, containing *Count*

Robert of Paris and *Castle Dangerous*. The whole of these novels, except where otherwise specified, consisted of three volumes, and, with those formerly enumerated, make up the amount of his fictitious prose compositions to the enormous sum of seventy-four volumes. During all this time his editorial and other literary labours were numerous.

Throughout the whole of his career, both as a poet and novelist, Sir Walter was in the habit of turning aside occasionally to less elaborate avocations of a literary character. He was a contributor to the *Edinburgh Review* during the first few years of its existence. To the *Quarterly Review* he was a considerable contributor, especially for the last five or six years of his life, during which the work was conducted by his son in law, Mr Lockhart. To the supplement of the sixth edition of the *Encyclopædia Britannica* he contributed the articles *Chivalry*, *Romance*, and *the Drama*. In 1814 he edited the works of Swift, in nineteen volumes, with a life of the author. In the same year he gave an elaborate introductory essay to a work entitled *Border Antiquities* (two volumes, quarto), which consisted of engravings of the principal antique objects on both sides of the Border, accompanied by descriptive letter press. In 1815 he made a tour of France and Belgium, visiting the field of Waterloo. The result was a lively traveller's volume, under the title of *Paul's Letters to his Kinsfolk*, and a poem styled *The Field of Waterloo*. In the same year he joined with Mr Robert Jameson and Mr Henry Weber in composing a quarto on *Icelandic Antiquities*. In 1819 he published *An Account of the Regalia of Scotland*, and undertook to furnish the letter press to a second collection of engravings, under the title of *Provincial Antiquities and Picturesque Scenery of Scotland*, one of the most elegant books which has ever been published respecting the native country of the editor. In 1822 he published his dramatic poem of *Halidon Hill*, and in the same year he contributed a smaller dramatic poem, under the title of *Macduff's Cross*, to a collection by Miss Joanna Bailie. The sum of his remaining poetical works may here be made up by adding *The Doom of Devergoil* and *The Auchindrane Tragedy*, which appeared in one volume in 1830.

The great success of the earlier novels of Sir Walter Scott had encouraged his publishers, Messrs Archibald Constable and Co., to give large sums for those works, and, previous to 1824, it was understood that the author had spent from £50,000 to £100,000 thus acquired upon his house and estate of Abbotsford. During the months which his official duties permitted him to spend in the country, that is, the whole of the more genial part of the year, from March till November, excepting the months of May and June, he kept state, like a wealthy country gentleman, at this delightful seat, where he was visited by many distinguished persons from England, America, and the Continent. As he composed chiefly between 7 and 11 a.m. he was able to devote the greater part of the morning to rural avocations, while the evenings were in a great measure devoted to his guests. In March, 1820, George IV., who was a great admirer of his genius, and indeed his personal friend, created him a baronet of the United Kingdom, being the first to whom he had extended that honour after his accession to the crown. In 1822, when the king visited Scotland, Sir Walter took a most prominent part in the ceremonies attending the royal visit.

But the prosperity so rarely enjoyed by men of letters was in Scott's case more apparent than real. To the outside public his means appeared to be derived solely from his professional and literary avocations, but he had early become a partner in the printing and

publishing firm of Ballantyne and Co., who were intimately connected with the great publishing house of Constable and Co. Both firms had engaged in a highly speculative business, in 1826 they became bankrupt, and Scott was involved in liabilities to the extent of nearly £150,000. He encountered adversity with dignified and manly intrepidity. On meeting the creditors he refused to accept of any compromise, and declared his determination, if life was spared him, to pay off every shilling. He insured his life in their favour for £22,000, surrendered all his available property in trust, sold his town house and furniture, and removed to a humbler dwelling, and then set himself calmly down to the stupendous task of reducing this load of debt. The only indulgence he asked for was time. A month or two after the crash Lady Scott died—domestic affliction thus following fast on worldly calamity. The divulgement of the Waverley secret had now become indispensable, and took place at an anniversary dinner of the Edinburgh Theatrical Fund Association in February, 1827.

Sir Walter was engaged at the time of his bankruptcy in the composition of a *Life of Napoleon Bonaparte*, which was originally designed to fill only four volumes, but eventually extended to nine. In the autumn of 1826 he paid a visit to Paris, in order to acquaint himself with several historical and local details requisite for the work upon which he was engaged. The *Life of Napoleon* appeared in summer, 1827, and though too bulky to be very popular, and too hastily written to bear the test of rigid criticism, it was understood to produce to its author a sum little short of £12,000. This, with other earnings and accessory resources, enabled him to pay a dividend of 6s 8d to his creditors. About the same time the copyright of all his past novels was brought to the hammer, as part of the bankrupt stock of Messrs Constable and Co. It was bought by Mr Robert Cadell at £8400, for the purpose of republishing the whole series, illustrated by notes and prefaces, and amended in many parts by the finishing touches of the author. Sir Walter or his creditors were to have half the profits in consideration of his literary aid. This was a most fortunate speculation. The new edition began to appear in June, 1829, and such was the eagerness of all ranks of people to contribute in a way convenient to themselves towards the reconstruction of the author's fortunes, that the sale soon reached an average of 23,000 copies. The author was now chiefly employed in preparing these narratives for the new impression, but he nevertheless found time occasionally to produce original works. In November, 1828, he published the first part of a juvenile history of Scotland, under the title of *Tales of a Grandfather*, being addressed to his grandchild, John Hugh Lockhart, whom he typified under the appellation of Hugh Littlejohn, Esq. In 1829 appeared the second, and in 1830 the third and concluding series of this charming book. In 1830 he also contributed a *History of Scotland*, in two vols., to the periodical work called *Lardner's Cabinet Cyclopædia*. In the same year appeared his *Letters on Demonology and Witchcraft*, as a volume of Murray's Family Library, and in 1831 he added to his *Tales of a Grandfather* a uniform series on French history. At this time also two sermons, which he had written a considerable time before for a young clerical friend, were published by that individual in London, and as specimens of so great an author in an extraordinary line of composition, met with an extensive sale. The profits of these various publications, but especially his share of the profits of the new edition of his novels, enabled him towards the end of the year 1830

to pay a dividend of 3s in the pound, which, but for the vast accumulation of interest, would have reduced his debts to nearly one-half. Of £54,000 which had now been paid, all except £6000 or £7000 had been produced by his own literary labours, a fact which fixes the revenue of his intellect for the last four or five years at nearly £10,000 a year. Besides this sum Sir Walter had also paid up the premium of the policy upon his life, which, as already mentioned, secured a *post obit* interest of £22,000 to his creditors. On this occasion it was suggested by one of these gentlemen (Sir James Gibson Craig), and immediately assented to, that they should present to Sir Walter personally the library, manuscripts, curiosities, and plate, which had once been his own, as an acknowledgment of the sense they entertained of his honourable conduct.

In November, 1830, he retired from his office of principal clerk of session, with the usual superannuation allowance. Even when engaged in his official duties he had seldom allowed a day to pass without filling a sheet (sixteen pages) of print. During the winter succeeding his retirement symptoms of gradual paralysis, a disease hereditary in his family, began to be manifested. His contracted limb became gradually weaker and more painful, and his tongue less readily obeyed the impulse of the will. Since the early part of the year 1831 he had in a great measure abandoned the pen for the purposes of authorship. This, however, he did with some difficulty, and it is to be feared that he resumed it more frequently than he ought to have done. In the autumn his physicians recommended a residence in Italy as a means of delaying the approaches of his illness. To this scheme he felt the strongest repugnance, as he feared he should die on a foreign soil, but by the intervention of friends he was prevailed upon to comply. He sailed in a government vessel from Portsmouth on the 27th of October, and on the 27th of December landed at Naples. In April he proceeded to Rome, and subsequently paid visits to Tivoli, Albani, and Frascati. Feeling, however, that his strength was rapidly decaying, his desire to return to his native land became irrepresible, and he hurried homeward with a rapidity which, in his state of health, was highly injurious. He experienced a further severe attack of his disorder in passing down the Rhine, and reached London in nearly the last stage of physical and mental prostration. To gratify his dying wish he was conveyed by the steam packet to Leith, and on the 11th of July, 1832, reached once more his favourite house at Abbotsford. Here he expired on the 21st of September, 1832. He was interred in his family burial aisle amidst the ruins of Dryburgh Abbey.

Sir Walter left a family of two sons and two daughters. The elder son, whose name was also Walter, died in 1847, the younger, Charles, died in 1841. The elder daughter was married in 1820 to Mr J. G. Lockhart, and died in 1837, the younger daughter, Anne, did not long survive the death of her father. In private life Sir Walter was distinguished for uprightness and purity of character, for great simplicity and kindness of manners, and benevolence of heart.

Whether in prose or verse Scott was a poet. The charm of his writings is founded primarily on the love of nature, which gave him his sympathetic power as a delineator of her in all her moods and aspects. Closely allied with this was his enthusiasm for anti-quarian lore, and the attractions with which he surrounded this usually dry study are to be ascribed to the element of imagination which he thus introduced into it. It was with no rigid realism in exploring the by ways of history that Scott was inspired. Beauty

and quaintness of association, and especially the kind of interest called romantic, were his attractions. His historical studies were guided by a similar principle, and he popularized a new form, the historical novel, which has been much censured by severe critics. The historical novel was not strictly new, but only uncommon before Scott's time. It had been exemplified by Defoe in the *Memoirs of a Cavalier*, with a more realistic effect than in any of Scott's productions of the kind. As a painter of manners he always excelled in the just proportions, vividness, and life-like reality of his representations. To these qualities it is due that he was able, if not to reproduce the past, at least to make the semblance of a revival live upon his page. His study of character was rather that of a keen observer, with a large share of genial humour, than of a profound analyst. His well-dressed characters in ordinary situations talk and act with conventional stiffness. It is in exciting situations, or in painting humble life alone, that Scott allows himself full scope, and in the latter his characters are rich, varied, full of humour and pathos, and even fuller of life.

His poems owed much of their early popularity to the brilliant descriptions of Scottish scenery, which fell as a surprise upon English society, but after being eclipsed by the novels they have recovered a place which they will not readily lose. Devoid of many of the higher qualities of poetry, carelessly constructed, and almost painfully monotonous in the jingle of the verse, the best of the larger epics display throughout a stir and vigour in the narrative, a clearness and brilliancy of tone in the descriptions, and a chivalrous and patriotic enthusiasm in the whole spirit that animates them, which can never fail of exciting sympathy and admiration, while particular passages here and there, and some of the minor poems scattered throughout his works, are polished gems of a much higher order.

The novels may be divided into three periods. Those of the first period, embracing *Waverley*, *Guy Mannering*, *The Antiquary*, *The Black Dwarf*, *Old Mortality*, *Rob Roy*, and *The Heart of Midlothian*, are generally admitted as a class to stand considerably higher than those of the following periods, although individual critics have often selected particular works of a later date as entitled to the first rank. The second period, up to 1825, contains many notable works, as *Ivanhoe*, *The Bride of Lammermoor*, and *Kenilworth*, and others, in which a distinct falling off is perceptible. The third period, after his failure, produced one or two works, showing a marked decline. Almost the only novels of any note produced in it are *Woodstock* and *The Fair Maid of Perth*, which, however, are not inferior to some at least of his second period.

With regard to Scott's general character we may quote the following from Lockhart's admirable *Life*. 'The grand virtue of fortitude, the basis of all others, was never displayed in higher perfection than in him, and it was, as perhaps true courage always is, combined with an equally admirable spirit of kindness and humanity. His pride, if one must call it so, undebased by the least tincture of mere vanity, was intertwined with a most exquisite charity, and was not inconsistent with true humility. If ever the principle of kindness was incarnated in a mere man it was in him, and real kindness can never be but modest. In the social relations of life, where men are most effectually tried, no spot can be detected in him. He was a patient, dutiful, reverent son, a generous, compassionate, tender, husband, an honest, careful, most affectionate father.' Before his death his debts had been greatly reduced, and the subsequent profits of his

works fully liquidated them. See Lockhart's *Life*, *Last Journals* (1890), and *Familiar Letters* (1894).

SCOTUS, DUNS. See DUNS.

SCOTUS, JOHN. See ERIGENA.

SCOURING, a term commonly applied not merely to cleaning by friction, but to the use of various chemical agents for the expulsion of foreign substances from the material operated upon. Soap is now the commonest and most important of the auxiliary appliances used in cleaning textile and fibrous materials, but in cases where its use is inappropriate or inefficacious many other detergents are employed. The selection of these in the case of delicate, and especially of coloured fabrics, is often a matter of considerable difficulty, and the prescription for each case must depend upon an exact knowledge of the circumstances. Soda, ashes, argillaceous earths, and ox gall are, after soap, among the most common detergents. Spots of grease are removed by soap, alkalis, ether, or essential oil of turpentine. When soap is not strong enough the application of an alkali will convert the grease into soap, which may be washed out or dissolved by spirit of wine. When an alkali would be dangerous, as in destroying colour, French chalk, or simple blotting paper, with the application of heat, may be used as an absorbent. Ox gall generally dissolves grease without injuring colours. For grease stains, and also for those produced by paint or resinous substances, nothing is more generally effective and less injurious to colour or texture than turpentine. A mixture, in equal quantities, of essential oil of turpentine and oil of lemon peel is called *scouring drops*. A combination of soap, ox gall, and absorbent earth is known by the name of *scouring balls*. The natural grease on wool is cleansed by steeping in water, together with stale urine, heated to 140°. The ammonia of the urine is absorbed by the grease, which it converts into a soap. The wool is then moved about in running water till the grease is completely separated. Grease may be removed from carpets by covering them with a hot paste of fuller's earth, and brushing it off when dry. The spots may then be washed with soap or ox-gall and water. Soap and water or wood vinegar will remove stains of ink when perfectly new. Citric acid or salt of lemons is one of the best means of removing old ink stains or iron mould. Oxalic acid (a strong poison) may be used for the same purpose. Bleaching liquid (a solution of chloride of lime) is the most effectual means of removing from linen stains of vegetable substances, as fruit or wine. In scouring establishments grease spots are taken out with strong soap liquors, used cold. Coloured articles, after being washed, are placed in a solution of salt or weak acid to prevent the colours from giving way.

SCRANTON, a city of the United States, capital of Lackawanna county, Pennsylvania, in a valley near the Lackawanna River, 150 miles WNW of New York. It is brought into communication with the rest of the country by numerous lines of rail way, many railways around it being electric. Scranton is regularly laid out with wide, well built streets, and contains a public library, a famous collection of Indian relics, an opera house, hospital, &c. It owes its rapid prosperity to the numerous collieries in the vicinity, to its large rolling mills and steel works, and extensive manufactures of railway rolling-stock, machinery, edge tools, leather, window sashes and blinds, silk fabrics, &c. The city was founded in 1840, pop. in 1890, 75,215, in 1900, 102,026.

SCRAP METAL consists either of the remains of worn out articles or of the scraps rejected in the processes of manufacture, and which are only useful for re-casting. The scraps of brass, copper, iron, and tin are carefully collected in order to be re-fused and

cast in masses suitable for use. Scrap-iron is especially valuable, as the castings from it possess greater strength than those made from unused material.

SCREAMER, the name given to two genera of Gallatorial or Wading Birds, forming the sub-family Palamedeinae. In the genus *Palamedea* the nostrils are oval, the head possessing a cylindrical horn, whilst the wings have their third and fourth quills longest, and the toes are covered with square scales above. To this genus belongs the Horned Screamer (*Palamedea cornuta* see fig at ORNITHOLOGY) of Central America, which inhabits hot morasses and swamps. This bird averages the common turkey in size. Its wings are provided with large spurs on the shoulder. The head bears a horn of from 3 to 4 inches in length, and which attains the diameter of a goose-quill. The function of this appendage is unknown. The voice is shrill and loud. The plumage is a blackish brown above, the head and neck having the feathers marked with white.

The genus *Chauna*, of which the Chaja or Crested Screamer (*C. chajara*) is the representative, has a bill the tip of which is hooked. The third and fourth quills are longest in the wings of this genus also. No horn exists on the head. The name 'Chaja' is given to this species from the sound of its cry. This bird occurs in Brazil and Paraguay. It is of solitary habits. The wings possess, as in the former case, two spurs each. The colour is a bluish gray marked with black, the neck being encircled by a black collar, whilst a tuft of feathers on the head constitutes a crest. Round the eyes the skin is naked, and of a red colour. The food consists chiefly of plants, and the flight is strong. The eggs are two in number.

SCREEN, in ecclesiastical architecture, is a partition of stone, wood, or metal to separate different parts of the building, as the nave or an aisle from the choir, or a private chapel from the transept. In modern architecture the term screen is applied to an open colonnade of a single line of columns.

SCREW, a twisted surface. A finite straight line revolving round one of its extremities generates a plane circular surface, but if, while it revolves regularly, its extremity moves regularly along a right line, which is always at right angles to the revolving line, a screw is generated.

The distance which the finite right line traverses along the second line during one revolution is called the *pitch* of the screw. When a solid cylinder is generated round the axis of a screw, and the surface has a definite thickness, it may take the appearance of a cylinder with a square thread wound helically round it, this is called a *square threaded screw*. If the space between coils of thread be sunk as an angular trough, and the thread be cut to have only one corner, the screw becomes an *angular threaded screw*. Screws may also be *round threaded*. When the pitch of a screw is very considerable it is often necessary to have a number of threads on the same cylinder. Blacksmiths sometimes ornament a piece of square iron by heating it and giving it several twists, when it takes the appearance of a screw of four threads, each corner of the iron being a thread. If the mechanical appliance called a screw be described as a cylinder having a thread or threads coiled in a regular helix or in regular helices round it, a nut may be described as formed by a thread or threads coiled in the same way against a hollow cylinder surface. All ordinary screws are right-handed, that is, if one looks at the point of the screw, the nut will go on when turned in the direction of the hands of a watch, left handed screws are made for special purposes, and their nuts screw on in a direction opposite to that of the hands of a watch. The screw-coupling of a railway carriage is formed of

a right-handed and a left-handed screw joined head to head, and when it is turned the two nuts either approach one another or recede from one another. The screw, considered as a mechanical power, is supposed to have an arm or lever fastened to its head. If *L* be the length of the lever, and *P* the pitch of

the screw, the *mechanical advantage* is $\frac{2L}{P}$, 31416,

where *L* and *P* are measured in the same units. The friction, however, is very great, and on this account the *mechanical efficiency* is usually much less than half the *mechanical advantage*. The *micrometer screw* is used to measure very small distances. Suppose the head of a screw to be 4 inches in circumference, and divided into fifty equal parts, and that the pitch of the screw is $\frac{1}{10}$ of an inch, when the head is turned through one division the point of the screw has moved through $\frac{1}{500}$ of an inch. *Hunter's screw*

is formed of two screws which screw into one another, the pitch differs slightly, and for each turn of the head the progress of the point of the compound screw is the difference of pitch: this is also called a *differential screw*. The mechanical advantage of Hunter's

screw is $\frac{2L}{D}$, 31416, where *D* is the difference of

pitch. If a simple screw were made to give the same mechanical advantage as a differential screw the thread would be too fine, and would very soon strip or be worn smooth. *Wood screws* are made of metal, and their thread has a sharp edge so as to form a nut as the screw passes into the wood. *Screw-piles* are piles having a cast iron screw on their point. This screw has a thread which becomes very extended in its last turns, it is intended to screw its way down into mud, sand, or clay. A ship's *screw propeller* is formed of short portions of two or more very extended threads, and it acts through the water just as the screw pile moves down through mud or a wood screw through wood. A screw is sometimes employed to work against the teeth of a wheel, and in this way it acts as a pinion of one tooth, for by each revolution of the screw a tooth of the wheel is moved through the space of one pitch, which is also the pitch of the screw. A pipe twisted in the form of the thread of a screw was used by the ancients to raise water for irrigation purposes. When the axis of such a hollow helix is inclined to the horizontal at an angle, which depends on the pitch and the diameter of the core, the water will rise up it. This is the *screw of Archimedes*. The area of a screw surface is often required in connection with ships' screw-propellers, this can only be accurately found by means of the integral calculus.

SCREW-PINE (*Pandanus*), the type of an order of trees or bushes known as the Pandanaceae or Screw-pine order. They are natives of tropical regions, and abound in insular situations, such as the Eastern Archipelago. They branch in a dichotomous or forked manner, and are remarkable for their adventitious roots, which are emitted from the stem in proportion as the accumulating mass of thick, spirally arranged, linear lanceolate foliage increases in weight, and therefore the roots become additional props to the tree. The seeds are edible, and the flowers of some species are fragrant, as in the *Pandanus odoratissimus*, which is not uncommon in collections in this country, and conspicuous by its adventitious roots, and its long spiny leaves, resembling those of the pine apple, which are arranged in a screw-like manner. Many years ago the specimen in the palm house of the Edinburgh Botanic Garden had a lateral branch injured while being removed from one house to another, but in a short time an adventitious

tious root was projected from the axil of the injured branch, which, gradually growing downward, ultimately buried its lower end in the soil, thus forming a strong, permanent, mechanical prop to the branch. In the course of about five and twenty years the branch itself, having increased in length and weight, was beginning to give indications of bending towards the ground, when the same provident economy again rescued it from destruction by projecting a powerful adventitious root at the point where an artificial support might have been placed, midway betwixt the arm pit, so to speak, from whence the first adventitious root emerged and the extremity of the extended arm. The mechanical appliance thus afforded to this wonderful tree promises to suffice for all the future contingencies of its growth. See the plate at PALMS.

SCREW-PROPELLER, an apparatus for propelling steam vessels, universally used in war ships, and in steam merchant vessels with the exception of some passenger steamers for river, coast, and channel service, which are propelled by paddle wheels. It was formerly employed in conjunction with sails for long voyages, but it is never so now, except in the case of a few pleasure yachts, whose capacity for coal carriage is limited.

Proposals for using a screw propeller more or less like the modern apparatus of that name, were made in 1681 by Dr Hooke, about the middle of the eighteenth century by Dr Bernoulli of Groningen, and in 1784 by James Watt, but none of them seem to have gone further than to propose it. Engineers towards the end of the eighteenth century, in this country, France, and in the United States tried it experimentally, and in Great Britain a screw propeller was patented in 1785 by Joseph Bramah, in 1794 by Littleton, and in 1800 by Shorter. In 1804 John Stevens of Hoboken, U.S.A., constructed a vessel 68 feet long and 11 feet beam, which he drove by means of a four bladed screw propeller, and in the following year he built another vessel which he propelled by twin screws. These boats seem only to have been used for experimental purposes, as in 1807 he built a vessel named the *Phoenix* for commercial purposes, but she was driven by paddle wheels. An inventor of a screw propeller who seems to have realized its commercial utility, and to have carried his labours to a practical issue, was Robert Wilson of Dunbar. After many experiments, and a long course of patient and indefatigable investigation, he succeeded in 1827 in producing a screw propeller which on trial proved eminently satisfactory. Shortly afterwards it was brought under the notice of the Highland Society of Scotland, and a trial of the propeller was in consequence made on the sea at Leith, when, notwithstanding the roughness of the day chosen for the experiment, it proved as successful as on any former occasion. Some years afterwards, in 1832, the subject was brought before the Royal Scottish Society of Arts, another trial of the propeller was made at Leith, and Mr Wilson was presented with the society's silver medal for his invention. Every thing was so far assuring, but unfortunately the Lords of the Admiralty were deaf to all applications, and the ingenious inventor was thus compelled to forgo all hopes of reaping any reward from the Admiralty for his long and persevering labours. John Ericsson, formerly an officer in the Swedish army, and residing in England in 1836, also patented a peculiar form of screw propeller, and designed a little steamer 40 feet long by 8 feet beam, which attained 10 miles an hour on trial when driven by his propeller. He endeavoured to interest the British Admiralty in his improvements but without

success. Ericsson took up his residence in the United States, where his talents were more appreciated.

The efforts of Mr F P Smith, who had made experiments with the screw-propeller in 1808, met with better success, and to him must be conceded the honour of having first procured the adoption of the screw for the vessels of the British navy.

Mr Smith, latterly Sir Francis Pettit Smith, a native of Hythe, in Kent, was led to devise various modes for the propulsion of vessels. In 1834 he constructed a vessel to be driven by a screw, which admirably answered his expectations. The following year he constructed a superior model, with which he experimented on a horse pond at his farm at Hendon, and in 1836 he took out a patent for propelling vessels by means of a screw revolving beneath the water at the stern. A small steamer of 10 tons, having an engine of six horse power, was built on the screw principle, and tried both on the Paddington Canal and on the Thames with complete success. In 1838 he succeeded in inducing the Lords of the Admiralty to make a trial of the sailing capabilities of his vessel. Their verdict was favourable, and with the view of testing still further the merits of Mr Smith's invention, the *Archimedes*, of 237 tons burden and eighty horse power, was built and launched under official sanction. The result showed the efficacy of the screw propeller so well that the *Rattler* was commenced at Sheerness in 1842, and other steam vessels on the same principle rapidly followed. Sir Francis Smith died in 1874, having received the honour of knighthood three years before. He had enjoyed a civil list pension of £200 a year from 1855, and from 1860 was curator of the Patent Office Museum, South Kensington.

The screw propeller consists of two, three, or four blades with helical surfaces exactly alike, connected to the engine shaft at the extremity of its length, each blade being set at the same angle with the centre line of the shaft. The shaft in a single screw ship is laid along the centre line of the ship from the engine to the propeller, and is supported at various points in its length, the last support being given by the body post of the stern frame in a single screw vessel, and by the propeller brackets where there are twin screws, one on each side of the centre line of the ship. The shaft on leaving the ship passes through the stern tube, terminating in the parts named above, and there it is packed round so as to prevent water entering the ship. The propeller in a single screw ship works in an aperture formed in the 'dead wood' immediately in front of the post carrying the rudder. The blades of the propeller may be joined individually to the propeller boss, a spherical protuberance at the end of the shaft, or the propeller boss and blades may be cast in one and the whole connected to the shaft. The former system has the advantage that a single blade if broken can be replaced without renewing the whole propeller, and that the angle at which the blades are set can be altered, also, a built propeller can be more easily handled than one cast complete. The latter system ensures uniformity of pitch in the setting of the blades, and a good finish at the boss. Propellers were formerly all made of cast iron, now they are more often made of cast steel or some bronze alloy, in the vessels of the British Admiralty and most of the fast mail steamers the propellers are always made of bronze, which takes and retains a finer surface than steel or iron.

The diameter of a propeller is the diameter of the circle described by the tips of the blades when revolving, and the area of this circle is called the *disc area*. If a string be wound spirally round a

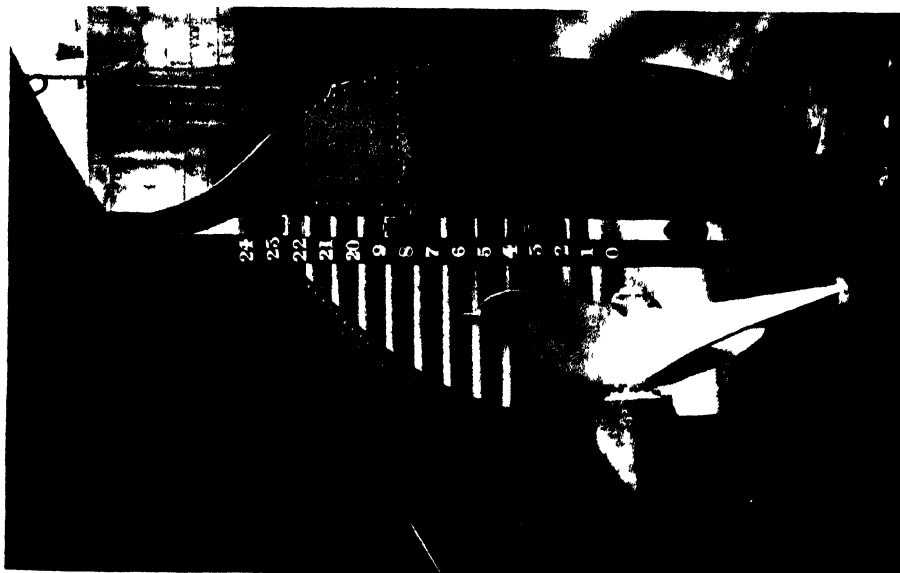


Fig 9 Stern of single screw steamer in dry dock—broad-side view

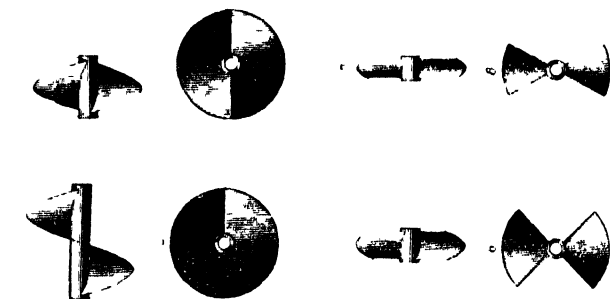


Fig. 1 is a new trial by Smith in experimental stream ends, shown silences and ends. The first of two trials, 1.2), instead of the first turning in the turn, the second (two) takes their turn each, the third (two) takes a quarter, and the fourth (two) takes each of a half, a turn which are the test results.

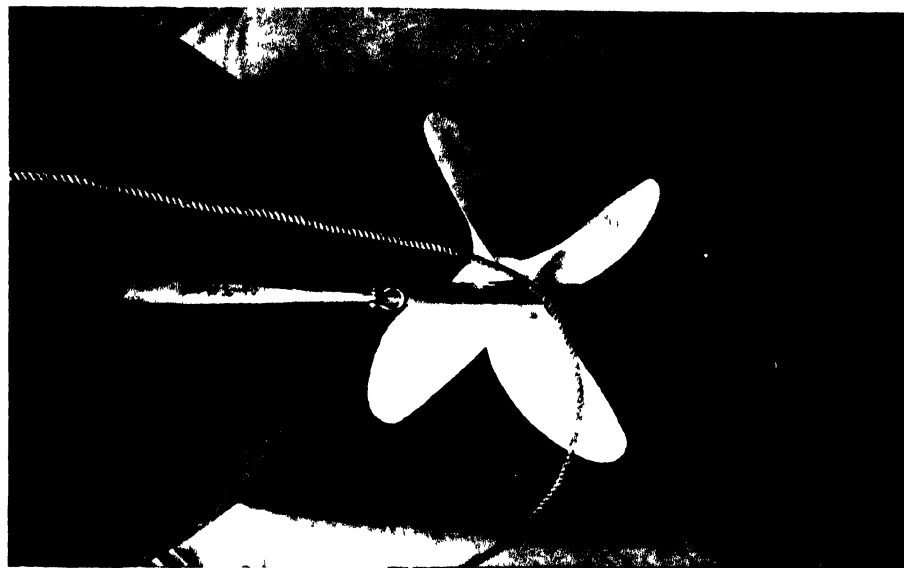


Fig. 10 Stern of single screw steamer in dry dock, end view

SCREW PROPELLER—II



Stern View of Twin screw Steamer, showing the modern practice of bossing out the frames and plating round the shafting right aft to the propeller

cylinder of the same diameter as the shaft, it will form a screw. If, instead of a string, there be wound a projecting sheet of metal, and a length equal to the length of the boss be cut off, a one bladed propeller will be formed, if three projecting sheets of metal were used, forming three screws, we should obtain a three bladed propeller. In practice, propellers are not always of the same length as the boss, but may be of varying length throughout the blade, also, the blades may lead aft or forward. The *pitch* of the screw is the distance that the propeller would advance axially for one revolution, if the propeller were rotating in the manner that a screw does in a solid nut, and were free to move forward. *Pitch ratio* is the pitch of the propeller divided by its diameter. *Slip* is the difference between the forward speed which the propeller would have if it were a screw revolving in a solid nut, and the forward speed it actually has, viz, the speed of the ship. It is expressed algebraically as $pr - v$, where p is the pitch of the screw in feet, r is the number of revolutions per minute, and v is the speed of the ship in feet per minute. *Slip per cent* is the percentage that the ship is of the forward speed which the propeller would have if it were a screw revolving in a solid nut, and it is expressed algebraically by $100 \frac{pr - v}{pr}$. The majority of pro-

pellers are 'true screws', and have the after surface or 'face' of each blade a true helix, and therefore of a uniform pitch throughout the blade, but it is the practice of many engineers to vary the pitch slightly from root to tip.

The shafting and propeller are turned by the engine, and the form of the screw causes the propeller in rotating to project a column of water astern. The reaction caused by the resistance which the inertia of the mass of this column offers to being driven astern tends to make the propeller and shafting travel forward, but the shafting cannot travel forward inside the ship, being prevented by a block which takes the thrust of the propeller. This thrust-block is firmly connected to the structure of the ship immediately aft of the engine room. The shaft has collars shrunk or forged on to it, and these bear against collars on the thrust block and so transmit the thrust of the propeller to the ship. As all parts of the surfaces of the propeller blades move with the same angular velocity and have the same pitch, it follows that the angle which the fore and aft line of the shaft makes with the surface of the propeller near the root of the blades is more acute than the corresponding angle at the tip of the blade. The acuteness near the root of the blade causes that part to rotate the water rather than to send it astern, and as no reaction from this can send the vessel forward, all the energy spent in rotating this water is lost. Accordingly, that part of the blade is done without, and its place is commonly taken by the spherical boss, whose diameter is sometimes as great as one third the diameter of the propeller, and whose form offers only a limited resistance to rotation through the water. Most vessels have propellers of three or four blades, the two bladed propeller, once common, is now only seen in the very few sailing vessels which have screw propellers as auxiliary to propulsion. The fitting of motors on cruising sailing yachts points to its possible reintroduction for that class of vessel. All modern war ships have at least twin screws, as also have most ocean liners lately constructed, some battle ships have been fitted with three shafts and propellers. The introduction of the steam turbine, with its accompanying high number of revolutions, has brought with it the

necessity for several shafts, and several propellers of small diameter on each shaft. In the unfortunate torpedo boat destroyers *Cobra* and *Lipper* there were four shafts and three propellers on each shaft, the aftermost propeller having slightly more pitch than the middle propeller and the middle one more than the foremost one. It is desirable that all passenger or mail vessels making long voyages should be fitted with twin screws, many instances have occurred in which, when one engine broke down, the vessel steamed safely into port with the other engine, while many single screw vessels have drifted helplessly about for long periods, some probably having been lost due to a break down of the machinery of the single screw propeller possessed by it.

In vessels fitted with steam turbine machinery, the number of revolutions of the propeller per minute has been as high as 2000, in torpedo boat destroyers (which are generally fitted with reciprocating machinery) 400 revolutions per minute are attained, in battle ships about 120, and in cruisers about 140. In the mercantile marine, ocean liners and mail steamers have revolutions of from 70 to 90 per minute while some fast steamers have as many revolutions as 200, and the ocean carriers or tramp steamers have their propellers run at about 80 revolutions per minute.

In shape, propeller blades vary very much. Those of the Royal Navy, and of many merchant vessels, have their expanded surface a true ellipse, with the tip of the blade and the centre of shaft as the extremities of the major axis, and the minor axis is made about one half this in length. This is the form introduced by Griffiths in 1849, with which is always associated the large boss already mentioned.

There is no accepted complete theory of the screw propeller, but there are a number of empirical rules that are of considerable value for designing a propeller, many of them being based on practical experience of similar types. Some investigators have made numerous experiments with models with a view to determining the best form of propeller for particular vessels, and also for constructing rules and formula by which dimensions of propellers for all kinds of vessels may be designed. The principal items to be determined in designing a propeller are diameter, pitch, and area of blades. Several things require to be known before these can be fixed—viz intended speed of vessel, indicated horse power required to produce that speed, number of revolutions that will best enable the engine to develop the I H P with the maximum efficiency, depth of immersion or draught of the vessels. The last is a point of great practical importance. If the propeller is not sufficiently immersed, it will carry down with it, in revolving, a quantity of air that will impair its efficiency. An approximate method of fixing the dimensions is to divide the speed of the ship, plus a percentage for slip varying from five to twenty per cent, by the number of revolutions of the engine, the quotient being the pitch of the propeller. Dividing the pitch by a suitable pitch ratio, the diameter is obtained. In the experiments made by Mr Froude he found that there was a large margin of pitch ratio consistent with efficiency, extending so far as from 8 to 2.4. In actual practice, however, it is found inadvisable to have too coarse a pitch, and the ratio should be small, say 1.1 to 1.25.

Another method is based on the results of the experiments made by Mr Froude, and given in a paper read at the Institution of Naval Architects in 1886. This paper gives most elaborate details of the results obtained by him, and these have been condensed in popular form in Mr Sydney Barnaby's standard work on Marine Propellers.

In the case of ships for His Majesty's Navy, the dimensions of propeller most suitable are determined by the results of experiments made by towing revolving propellers behind the models of the vessels in the experimental tank at Haslar. In these experiments, the force required to turn the propeller and the thrust exerted by the propeller are measured by delicate dynamometers. The results of these experiments are frequently verified by fitting different propellers of similar design to the actual vessel. These experiments give data from which the best diameter and pitch ratio can be determined.

While the various methods of getting the dimensions of the propeller give results of great practical value, there are so many external circumstances affecting the question that each case requires also to be considered on its own merits, and any abnormal condition, such as fullness of after body lines, should be carefully considered.

The area of the blades required is a more difficult matter. It can best be determined from data derived from the results of similar vessels with similar propellers, the area of the blades being made the same percentage of the disc area as in the type steamer. A mistake in area can generally be detected by a consideration of the curve of slip. If the area is too small or too large the slip at high speeds will be very large. A general rule that gives good results in ordinary vessels is as follows:—Area of blades = Disc area \times .35 for fine vessels to .45 for full vessels. The number of blades over which this area is divided should be small. Two blades give the best results in smooth water, but in a sea way when the vessel is pitching, the propeller is frequently out of water, producing 'racing' of the engines and excessive vibration of the hull. Three blades obviate this objection to a certain extent, but the loss of one blade through accident may leave the propeller badly balanced, and throws an undue strain on the engines. Four blades have therefore become the almost universal practice in merchant vessels, although three blades are still the rule in fast twin screw steamers.

The form of the blade is a subject on which every engineer has his own ideas, but model experiment and actual practice have proved that it is not a matter of great importance. As a rule, in cargo merchant ships the greatest breadth of the blade is arranged at almost one third of the diameter, measuring from the centre, and the blade may be described as pear-shaped in form. A great deal of useful experimental work remains to be done upon the screw propeller.

SCRIBE, AUGUSTIN EUGÈNE, one of the most versatile and prolific dramatic writers in modern times, was born in Paris on 24th December, 1791. His father was a merchant, and bequeathed to his son a considerable fortune. Young Scribe was originally intended for the legal profession, but early abandoned it for the more congenial occupation of a writer for the stage in which his success from the first was very decided, his first piece being *Les Dervis*, written in conjunction with his friend Germain Delavigne, and produced in 1811. To give a detailed list of Scribe's dramatic pieces would be an impossible task. They comprise all the departments of the lighter kind of drama, and from their gaiety and interest of plot, as well as the felicitous manner in which modern French life is depicted in them, have acquired a universal popularity over the Continent, and have also been introduced on the English stage in the form of translations. Among his vaudevilles may be mentioned *Le Comte Ory*, *Le Nouveau Pourcauignac*, and *Une Visite à Bedlam*. He wrote for the Odéon, the Porte St. Martin, and the Variétés theatres, but more especially for the Gymnase Dramatique, to which he furnished *La*

Maîtresse du Logis, *Malvina*, ou un mariage d'inclination, *Le Mariage de Raison*, *Geneviève*, ou la Jalouse Paternelle, *Maître Jean*, ou la Comédie à la Cour, *L'Amitié*, ou les Trois Époques, *Héloïse et Abailard*, and numerous other pieces. To the Théâtre Français he contributed *Bertrand et Raton*, *Le Verre d'Eau*, *Adrienne Lecouvreur*, and *Les Contes de la Reine de Navarre*. As a writer of opera librettos Scribe is also deservedly famous, having supplied the composers with the text of the most celebrated of those produced at the Grand Opera and Opera Comique. We shall only mention *La Dame Blanche*, *Fra Diavolo*, *Robert le Diable*, *La Juive*, *Les Huguenots*, *Les Diamants de la Couronne*, *Les Martyrs*, and *Le Prophète*. From the multiplicity of works with which he was engaged, Scribe, like other French authors, availed himself largely of the assistance of *collaborateurs*, and much therefore which bears his name was in reality only subjected to his revision and superintendence. In 1838 he was admitted a member of the French Academy. He died on 20th February, 1861, leaving a large fortune.

SCRIBES, among the Jews, were officers of the law. There were *civil* and *ecclesiastical* scribes. The former were employed about any kind of civil writings or records. The latter studied, transcribed, and explained the Holy Scriptures.

SCRIP (abbreviation of *script*), a schedule or certificate. It is commonly used for a certificate of loans or shares in a joint stock company, whether as a temporary acknowledgment or the permanent voucher of the holder's interest. Scrip may accordingly be either transferable or not transferable. The valid transfer of interest may be effected only by registration in the books of the company, or the transfer of the scrip itself may be held to represent a valid transfer of interest.

SCROFULA, or SCROFULA (from *scrofa*, a swine, because this animal is said to be much subject to a similar disorder), a disease due to a deposit of tubercle in the glandular and bony tissues, and in reality a form of tuberculosis or consumption. It generally shows itself by hard tumours of the glands in various parts of the body, but particularly in the neck, behind the ears, and under the chin, which, after a time, suppurate, and degenerate into ulcers, from which, instead of pus a white curdled matter is discharged. The first appearance of the disease is most usually between the third and seventh year of the patient's age, but it may arise at any period between this and the age of puberty, after which it seldom makes its first attack. It most commonly affects children of a lax habit, with smooth, fine skins, fair hair, and rosy cheeks. It likewise is apt to attack such children as show a disposition to rickets. Like this disease, it seems to be peculiar to cold and variable climates, being rarely met with in warm ones. Scrofula is by no means a contagious disease, but is of a hereditary nature, and is often entailed by parents on their children. The attacks of the disease seem much affected or influenced by the periods of the seasons. They begin usually some time in the winter or spring, and often disappear, or are greatly amended, in summer and autumn. The first appearance of the disorder is commonly in that of small oval or spherical tumours under the skin, unattended by any pain or discoloration. These appear, in general, upon the sides of the neck, below the ear, or under the chin, but in some cases the joints of the elbows or ankles, or those of the fingers and toes, are the parts first affected. In these instances we do not, however, find small movable swellings, but, on the contrary, a tumour almost uniformly surrounding the joint, and interrupting its motion. After some time the tumours become larger

and more fixed, the skin which covers them acquires a purple or livid colour, and being much inflamed they at last suppurate, and break into little holes, from which, at first, a matter somewhat puriform oozes out, but this changes by degrees into a kind of viscid, serous discharge, much intermixed with small pieces of a white substance. The tumours subside gradually, whilst the ulcers at the same time open more, and spread unequally in various directions. After a time some of the ulcers heal, but other tumours quickly form in different parts of the body, and proceed on, in the same slow manner as the former ones, to suppuration. In this manner the disease goes on for some years, and appearing at last to have exhausted itself, all the ulcers heal up, without being succeeded by any fresh swellings, but leaving behind them an ugly puckering of the skin, and a scar of considerable extent. This is the most mild form under which scrofula appears. In more virulent cases the eyes are particularly the seat of the disease, and are affected with ophthalmia, giving rise to ulcerations in the margins of the eyelids, and inflammation of the conjunctiva, terminating not unfrequently in an opacity of the transparent cornea. The joints become affected, they swell, and suffer excruciating deep seated pain, which is increased upon the slightest motion. The swelling and pain continue to increase, the muscles of the limb become at length much wasted. Matter is soon afterwards formed, and this is discharged at small openings made by the bursting of the skin. Being, however, of a peculiarly acrimonious nature, it erodes the ligaments and cartilages, and produces a caries of the neighbouring bones. Hectic fever at last arises, and in the end often proves fatal. The treatment consists chiefly in the use of means adapted to promote the general health, a nutritious diet, easy of digestion, a pure, dry air, gentle exercise, friction, cold bathing, especially in the sea, and strengthening medicines, as the preparations of iron, myrrh, murate of lime, cod liver oil, &c. Cod liver oil is a most valuable therapeutic. Various mineral waters, and other remedies which moderately promote the secretions, appear also to have been often useful. In irritable states of the system hemlock has been employed with much advantage. The applications to the tumours and ulcers must vary according to the state of the parts, whether indolent or irritable, where the tumours show no disposition to enlarge, or become inflamed, the application of iodine is often of great service, and when ulcers exist stimulant lotions or dressings must be used to give them a disposition to heal. But if they are in an irritable state, a cataplasm, made with hemlock or other narcotic

SCROLL, a very frequent ornament in architecture, consisting of a band arranged in undulations or convolutions

SCROPHULARIACEÆ (Figwort family), a natural order of monopetalous, hypogynous plants. The flowers are axillary or racemose, rarely spiked, the calyx is divided into four or five parts, unequal, persistent, inferior. The corolla is monopetalous, irregular, bilabiate or personate, sometimes spurred or saccate at the base, aestivation imbricate. Stamens usually four, didynamous, anthers bilocular or unilocular by abortion or adhesion, ovary two celled, free, ovules numerous, style simple, stigma generally two-lobed. Fruit commonly capsular, rarely fleshy, dehiscence usually septical or loculicidal, rarely opening by pores or lids. Placentas attached to the dissepiment, which becomes finally loose in the centre, sometimes to the mature fruit, becoming central. Seeds definite or indefinite, embryo straight or slightly curved with fleshy albuminous covering, leaves opposite, whorled, or alternate, plants herbs, under-

shrubs or shrubs, usually scentless, sometimes fetid, generally distributed both in hot and cold climates. The order has been divided into three sections, Salpiglossideæ, Antirrhinideæ, and Rhinanthideæ, distinguished by the aestivation of the corolla and the inflorescence, whether centrifugal, centripetal, or compound. This order is large, containing about 2000 species, very generally distributed over the world. Many of them are poisonous, and some are used medicinally. Some of them have very beautiful flowers. The order includes the fox glove, *calceolaria*, *mirabilis*, *mullein*, *antirrhinum*, *veronica* or speedwell, and *eyebright* or *euphrasia*.

SCUDÉRI, or SCUDERY, MADRIEINE DE, a once famous writer of long winded romances, was born at Havre on the 15th of November, 1607. She gives an account of her early life under the name of Sappho, the title assigned to her by her contemporaries, in her romance, *Le grand Cyrus*. At twelve, she says, she was spoken of as a person of mature judgment, and was admired by all the world. On coming to Paris she was admitted to the society of the *Hôtel Rambouillet*, and began to assist her brother Georges, a writer of plays, romances, sonnets, &c, in his literary labours. Her personal appearance was very far from being attractive, but she seems to have had on the whole a well endowed mind, and she is praised by all her contemporaries for her disposition and the qualities of her heart. Her first romances were published in her brother's name, either because it was not then usual for ladies to write, or because he had already acquired a reputation. It appears also that he at first assisted at the formation of the plot, or rather suggested the plan of her works. The works of *Mdlle Scudéri* have been the wonder of succeeding generations, or at least of the literary critics after her own day, and will probably continue to be so as long as they are remembered. The character of the works themselves is sufficiently explained by the circumstances of their production, but that which keeps curiosity alive regarding them is the fact of their protracted popularity, and especially the unanimity in their praise of the ablest men of the day. Her admirers range from Christina of Sweden to Mascarón, Fléchier, and Massillon. Bouleau himself did not dare to publish his satire during her lifetime. Her works may then be regarded as fairly representative of her age. They were in fact the reflection of the society in which she moved, and it is so far well that their faults were chiefly literary. These works consist chiefly of long romances of eight or ten volumes. The pervading sentiments which animate them are love and gallantry, their predominant characteristic is affectation, but if such an expression may be used, it is a sincere and genuine affectation. The tone of morality throughout them is consistently pure as far as action is concerned. All their extravagancies are extravagancies of sentiment. These romances, it must be understood, are classical. The heroes of *Mdlle Scudéri* are the heroes of antiquity, *Cyrus*, *Horatius Cocles*, *Mutius Scævola*, and *Brutus*. These and similar personages meet and discuss with appropriate heroines the anatomy of passion in endless conversations of the most refined subtlety. So far is the affectation carried that the most illustrious heroes do not find their own names good enough, in the romances of *Mdlle Scudéri*, to woo in. Thus *Cyrus*, the main object of whose existence is to express his admiration of *Mandane*, assumes the name of *Artamenes*, to enable him to do so with more effect. Such profound and penetrating views of antiquity were not, however, the main attraction of *Mdlle de Scudéri's* works. The names of her characters were, in fact, only a transparent mask

behind which her readers saw and read themselves. The society of the Hôtel Rambouillet furnished the originals for all the heroes of antiquity. Cyrus, it is well known, was the great Condé. Her plan of composition is said to have been very simple. The society of the day furnished her with endless materials, and last night's gallantries formed the subject of to day's description. Thus with conversation, epistle, sonnet, and madrigal, the endless work went on, a chronicle of petty intrigue under the greatest names of the world's history. After the reunions at the Hôtel de Rambouillet had been broken up by the troubles of the Fronde, Mdlle de Scudéri opened her own house to a select society on Saturday evenings. In this society, where everybody assumed a sentimental name, love was discussed, according to Mme de Sévigné, in language so involved, that the speakers would each have required a dragoman. Mdlle de Scudéri, if her biographers are correct, lived to a great age. She died in 1701. The popularity of Mdlle de Scudéri is probably to be accounted for in the simplest possible way—the want of anything better. At all times the demand for contemporary fiction is great, and it would not be difficult to find a great deal that is widely read at the present day that would compare very unfavourably even with the works of Mdlle de Scudéri. The interminable conversations and meaningless gallantries which make her works dull at present were precisely what gave them interest when all her characters were known, and as she was admired and respected by those she portrayed, it is evident they were flattered by her portraits. The principal works of Mdlle de Scudéri are *Ibrahim*, ou *L'Illustre Bassa* (four vols 8vo, 1641), *Artamène*, ou *le Grand Cyrus* (ten vols 8vo, 1650), *Cliche*, *Histoire romaine* (ten vols 8vo, 1656). Besides these are numerous other romances, poems, and ten volumes of conversations and moral discussions, which are said to be superior to her romances. She obtained the prize in the first competition of the French Academy in eloquence for an indifferent discourse on glory.

SCUDO, an ancient Italian coin, the equivalent of a crown. It was named from its bearing the impress of the heraldic shield (*L. scutum*) of the sovereign by whom it was issued. The scudo was of different value in different states and at different times. The recent value of the Roman scudo was about 4s 4d, that of Genoa 5s 4d, of Sardinia 3s 9d, Sicily 4s, Milan 3s 9d.

SCULL, a short oar, a pair of which can be manœuvred by a single rower. To scull is either to propel a boat with sculls from the centre, or with a single oar at the stern.

SCULPTURE may be defined as the art of imitating natural objects in solid substances. This embraces man, the animal and vegetable kingdoms, and the conventional treatment of forms derived from all these as ornaments. Sculpture, however, as we are about to consider it, is equivalent to the term STATUARY. The word means strictly a cutting or carving in some hard material, such as stone, marble, ivory, metal, or wood, but it is also used to express the modelling of soft substances, as clay or wax, and the casting in metals or in plaster. The imitation of living forms is alike the essence of sculpture and of painting, and both these arts were primarily decorative both in treatment and character, and were executed almost solely as adjuncts of architecture. History shows, however, that when Art advances beyond a certain stage, sculpture and painting generally assert themselves as independent arts, in which position they exist to day. Sculpture is distinguishable from architecture by its imitation of organic form, and is separable from painting by the mode

and material of its expression. Sculpture may, when employed in architecture, possess the added quality of colour, as in the case of much of Greek art and some Gothic work, but while painting makes its appeal to the sense of sight chiefly by the aid of that medium, sculpture concerns itself wholly with pure form, whether of line or in mass, and is therefore more limited in its expression than is the art of painting. When applied for architectural purposes it obeys in its character and by its treatment the particular style chosen.

Processes.—In producing a work of sculpture two processes are involved, 'modelling' and 'casting', of which the former alone is truly the work of the artist, the latter being simply a mechanical process. For modelling ornament and figure the same procedure is followed. If from the flat, a ground of clay is prepared, and upon it the lines of the ornament are lightly sketched, usually with a tool. These are then clothed upon with clay, firstly the important masses, then the connecting lines, and, lastly, the minor detail, the whole being afterwards modelled to the forms desired, the relief being obtained by a careful study of the shapes of the shadows, cast by the masses and lines which are being copied. For a head or bust a flat board, set on a high stand, with a strong square wooden peg standing up from it, is used. Lead piping is further bent above the height of this piece of wood to hold the clay together, and around this structure the clay is roughly built up, a cylindrical mass for the neck, and an egg-shaped form for the head. To further prevent the outer masses of clay falling away in process of work, small pieces of wood bound together and attached to the wooden peg by a string or wire are often used. These are technically termed 'butterflies'. Upon these roughened up masses of clay the position of the features and forms are marked, and the work carried to a completion by reference to the living model. For a full length figure an 'armature' is prepared, consisting of an iron passing through the centre, either of the body or one of the legs, and attached to which are other irons in the case of statues, or of lead piping for statuettes. These are bent to the required positions, the whole when complete representing in line the pose and character of the intended figure. To compose the lines of a figure or group so that the centre of gravity shall always fall through this central iron, is one of the mechanical problems of the sculptor's art. Upon and around the lines of this framework the figure is first roughly built up with clay, care being taken to add just as much as is requisite, and to follow the anatomical form and direction of the muscles. [The essential difference between modelling and carving lies in this, that in the former the artist works from within outwards by the addition of material, while in the latter from without inwards by the taking away of material.] The clay is laid on and modelled by the hands, aided in the more difficult passages by tools of various shapes made of boxwood, but it should ever be remembered that the sculptor's truest tool is his thumb. The sculptor's work proper generally ends with the completion of the clay model. The next process is that of casting, unless, as is often the case, the work when completed in clay is 'fired' in a kiln and becomes a 'terra cotta'. In casting ornament, plaster of Paris of the consistency of thick cream is poured over the model to the depth of from 2 to 3 inches, the inner layer being coloured. When this is 'set', the original clay is carefully removed, and what is termed a 'waste mould' is formed. This is carefully washed and when dry is then oiled. Into this mould plaster of Paris is poured, and when filled and set hard the waste

mould is chipped off. The plaster of Paris has then taken the place of the clay, and formed what is called a 'cast'. A head is usually cast in halves, that is, each half of the head is moulded at one time and the two moulds are joined together before the final plaster is poured in to complete the cast, and the treatment adopted in the case of complete figures is to cast them in parts or pieces. This is termed 'piece moulding'. Parts which project very much are removed and cast separately, being afterwards attached by means of plaster of Paris. The reproduction of this plaster cast in marble or stone is a mechanical operation, usually intrusted to a skilled workman, known as a 'pointer'. Standing the plaster cast and the block of marble each on separate stones, called 'scale stones,' he employs an iron instrument called a 'pointing machine,' by which he first finds out the distance of any point on the cast from an imaginary vertical plane placed in front, and into the block of marble drills a hole whose depth from the same plane equals this distance. Innumerable holes are thus drilled, and the solid marble cut away until the bottoms of all the holes are reached. This gives the form roughly, and the carver proceeds to copy from the plaster cast, carrying on the work under the supervision of the sculptor, who rarely carves the work himself except in the finishing touches. It is, however, worthy of mention that following the example of some of the Renaissance sculptors, particularly that of Michael Angelo, who used simply wax models, a few of the younger sculptors are essaying the difficult task of carving direct in the marble, treatments such as bas reliefs, without the intervention of a cast. For casting large groups and life sized statues in metal, usually bronze, a mould in sand is first taken from the original plaster cast. Within this is fixed a rudely formed, solid, but removable mass called a 'core,' the space between it and the surface of the mould being filled with the molten metal. This is known as 'sand mould' casting. Another method is called '*cire perdue*,' and is used only for small objects, such as busts and statuettes. In this, the piece mould is lined with wax, and the core inserted close up to the wax lining. The wax is then melted out and the molten metal poured into the mould to take its place, the core being afterwards removed. The *cire perdue* process, though a recent revival, was largely practised by the Greeks and by the later mediæval sculptors, notably by Benvenuto Cellini.

Materials—The materials used by the sculptor in all ages have varied but little. The Egyptians used basalt, porphyry, and granite. The Assyrian bas reliefs are for the most part in gypsum or alabaster, while for the colossal statues the artist employed a harder limestone, but there is abundant evidence to show that the use of metal as well as of *terra cotta*, was understood by the Assyrians. Nearly every kind of material was employed by the Greek artist, including ivory and gold, but the works that have come down to us are chiefly in marble, bronze, or *terra cotta*. Sculptors distinguish three kinds of work. When the figures are entirely detached or isolated, the work is said to be 'in the round'. When the forms are well nigh freed from the surface or ground it is called high relief, or *alto rilievo*, and when the forms are only partially relieved it is said to be low relief, bas relief, or *basso-relievo*. The Venus of Milo, in the Louvre, is an instance of sculpture in the round, the metopes of the Parthenon, now in the British Museum, are in high relief, and the frieze of the same building in low relief.

History *Sculpture in Asia, India*—The earliest records of sculpture that we possess exhibit the art

in complete bondage to religion. The artist has striven not to represent human or natural beauty, but to illustrate a strange and fantastic mythology. The forms that exist are scarcely imitative of the forms of the actual world, but are made up of conventional and grotesque combinations, having little or no relation to natural forms. In the sculptures of India this mystic and religious phase of the art is strongly expressed, the carved figures being of monstrous size and of wild deformity (as in Plate I, fig 15), although the skill in execution is often remarkable. Entirely subject to architecture as it should be, it was not controlled by the practical intellect of man, but was at the mercy of a fixed religious idea, and had therefore no chance of gradual and steady development. In fact statuary proper never existed in any shape of beauty like the human form throughout India, China, or even Persia.

Assyria—A noticeable feature of Assyrian art (see NINEVEH) is the perfection of animal form. The excavations at Nineveh, energetically conducted by Layard, and afterwards by the French consul Place, have brought to light a series of sculptured works of the utmost interest, and often of the highest beauty. These monuments extend over a considerable period (B.C. 880 to B.C. 630), and they exhibit, especially in the later specimens, a most important advance. On them the human form is treated with a fixed convention, the faces, like those in the best examples of Greek art, being impassive even in the midst of action, while the attitudes are stiff, formal, and impossibly posed. It is in the movement and passion of animal life that Assyrian art asserts its marvellous power and claims so high a place in the historic development of sculpture. To understand at once the scope and limitations of this phase of art, the student cannot do better than examine the series of bas reliefs representing a lion hunt by Sardanapalus, exhibited in the Assyrian room at the British Museum, where he will find in the animals and accessories all those energetic movements that are wanting to the human figures. Here no convention seems to have fettered the artist, the facts of nature have been studied in their entirety, and the power of the sculptor both to perceive and interpret natural action and emotion is abundantly illustrated in the representation of wounded and dying lions that, pierced by the arrows of the hunter, writhe in every attitude of pain. This subtle understanding of the physical facts of animal life, and the artistic sympathy with the expression of brute feeling, are manifested not less clearly in the colossal statues of lions and in the mythical figures of winged bulls that, dominated by a religious symbolism, remain as wonders of Assyrian art. In these decorative works there is no trace of the monstrosity that belongs to the Indian gods. The artist has based his invention upon a sound knowledge of the principles of animal organism, and he has therefore secured a result that is conventional and artistic.

Persia—Persian sculpture (560-331 B.C.) differs but little from Assyrian, and is usually included with it. The fragments of sculpture from the ruins of Persepolis (B.C. 521-467) exhibit the same relative inequality in the treatment of human and brute form that has been noticed in the bas reliefs from Nineveh. Roughly hewn and badly modelled, the force of the animal forms yet gives it a sense of the gigantic, analogous to that obtained by the Greeks in their treatment of Hercules, but without possessing no sense of ideal beauty. The human figures, elaborately costumed (see Plate I, fig 16), are still lifeless in movement and partly conventional in type, although the arrangement of the different

groups shows a better sense of order and design. As the offspring of Assyrian art, the sculpture of Persia misses some of the faults but also much of the beauty of its parent.

Sculpture in Africa, Egypt —It is to Egypt that we must turn for the first signs of higher and more vital art. The sculptures of Egypt are the oldest the world possesses, dating as far back as 3000 B.C. Looking to the product of Egyptian art as a whole it marks an advanced state of culture and civilization. At a date of which we have no record the Egyptian workmen had already passed beyond the rudiments of their art, and all that survives to us bears the stamp of a highly cultivated power. The distinctive characteristics of Egyptian sculpture are colossal size, stability, and symmetry, the expression being that of content, calm repose, and majesty. A conventional uniformity reigns everywhere with out life or action. Everything is subject to symbolic meaning according to formula laid down by authority. The work (see Plate I, figs 10 and 11), generally in syenite or basalt, was executed in accordance with the strict regulations of a canon of symbolic measurements, and this symbolism linked with admirable regularity of workmanship, give to Egyptian sculpture the distinction and dignity of a style. Some of the earliest works are found in the tomb caves that surround Memphis, and here too is the famous sphinx colossus, a figure combining the human with the brute form of a lion, carved almost entirely out of the living rock, and whose strange and calm beauty has puzzled and fascinated all later ages. Egyptian sculpture may be classed broadly into three styles: 1. The Egyptian proper, which reached its highest perfection about 1260 B.C. 2. The Ethiopic Egyptian. 3. The later Egyptian, leading to the decline about 523 B.C. The debased statues found in the later temples are the work of Greek artists. In the British Museum is to be found a splendid collection of Egyptian monuments, extending from B.C. 2000 to the Mohammedan invasion, A.D. 640. Amongst them may be found a number of figures representative of Sekhet, or the cat-headed goddess.

Sculpture in Europe, Greece —I have early products of art, valuable in themselves, are nevertheless chiefly interesting as leading the way to the fuller development of sculpture under the Greeks, whose art, unlike that of the preceding nations, can be traced from its earliest conception to its latest and fullest achievement. Modern research has availed to prove the indebtedness of Greek art to these earlier influences, and has thus established a link between the widely different products of eastern and western culture. The countries of Asia Minor may in truth be regarded as the meeting ground of the two civilizations, for here we find the traces of Egyptian, Assyrian, and Persian influence, and here, too, are found some of the first manifestations of the Greek spirit. Greek sculpture, in its infancy, is strongly stamped with oriental character. The records that we possess of this first growth are necessarily scanty, but in all monuments that survive, whether we look to works in marble or to the types used by the early coin engravers, the suggestion of Asiatic feeling and modes of workmanship is unmistakable. In its early stages Greek sculpture was purely decorative, and the student who desires to trace the gradual development of sculpture, and who would understand how rude and barbaric were its beginnings, should examine carefully the reliefs from the temple of Assos now in the Louvre, and the metopes from Selinus, casts of which are in the British Museum. In the Lycian room at the museum are also to be found some interesting monuments of this early period, probably dating as far back as the sixth

century B.C. These are first a series of colossal statues brought from Miletus, where they lined the sacred way from the harbour to the temple, and, secondly, the remarkable bas-reliefs upon the Harpy tomb from Xanthus.

Ægean Sculpture —From the end of the sixth century before Christ the development of Greek art was rapid and continuous. In the sculptures for the temple of Ægina, executed about 475 B.C., and now preserved at Munich, the artist mastered for the first time some of the realities of the human form. The figures are no longer of stiff conventional type, posed in lifeless attitudes, but have energy and movement in their action, and possess a vigorous naturalism gained only by artists who had studied the human form long and attentively, and when they are compared with the work on the Assyrian bas-reliefs we realize the enormous advance made towards a knowledge of the figure. These statues are all carved in the round, and, although the study of anatomy was carried on without dissections or any of those means of knowledge considered so helpful by later artists, the anatomical detail is singularly accurate, even to the veins and tendons, and the construction of the joints. Furnished with subjects from a noble mythology, and supported by this increasing knowledge of nature, the artist added more and more of reality to his work, and in the Athenian style, as exemplified in the frieze of the temple called the Theseum, parts of which are now in the British Museum, all archaisms were cast aside for a direct study of nature. This paved the way for the fullest development that was to follow, and Phidias is the master with whose name this triumph is enduringly associated. His statues of Athens in the Parthenon at Athens, and of Zeus in the temple at Olympia and the frieze of the Parthenon, marked the period of the highest effort of Greek art. In earlier work we have seen some preparation for the magnificence and beauty of his style, but the marbles of the Parthenon (410 B.C.) must ever remain, in their design and technique, no less than in their architectonic purpose the highest and truest example of decorative art. The English student of sculpture is fortunate in possessing in the British Museum, this, the finest existing work of antique art. In the procession of the frieze (see Plate II, figs 8-9), no less than in the female figures of the eastern pediment, we realize the combination of those great qualities of conception and execution that render this work of Phidias perhaps the most remarkable in the world. The names of other artists who contributed to this perfection have not been mentioned, for it is more important in such a sketch as this to understand the character of the progressive phases of art culture than to be burdened with a list of artists whose names have often survived without any authentic record of their genius. The special character of the art that flourished at Athens under the rule of Pericles, and by the all potent hand of Phidias, consists in a perfect balance and combination of sublime and human elements. Sculpture had reached that point when a faultless imitation of nature was within its reach, but it had not yet abandoned its spiritual connection with a splendid mythology. A fine example of a large and ideal treatment of the face, a work of this school, is found in the colossal bronze head of Artemis, now in the British Museum, and to the same period must be ascribed the relief representing the parting of Orpheus and Eurydice, in the museum at Naples, and the *Discobolus* of Myron and of Naucydes.

Later Athenian School —The next important movement in Greek art was towards a still closer imitation of actual human emotion. The characteristic

reserve of the sculpture of Phidias and of his pupil Alcamenas was exchanged for a more life like rendering of passion, and the artist began to be fascinated by the force and variety of human feeling as well as by the beauty of human form. The broken and unsettled political life of the time (400-323 B.C.) seemed to reflect itself in the spirit of Greek art. If we take Phidias and Alcamenas as the representatives of the earlier style, Scopas and his younger contemporary Praxiteles may stand as the exponents of the new and naturalistic treatment. The most important works of Scopas that survive are the decorations to the mausoleum at Halicarnassus, erected by Artemisia over the remains of her husband Mausolus, prince of Caria, B.C. 352. These sculptured decorations are now in the British Museum, and they present in the designs for the frieze, depicting a battle between Greeks and Amazons, a very striking illustration of the new phase of art, wherein the interpretation of human feeling partly controls the choice of design. The works of Praxiteles, of whose life nothing is known, are especially valuable as expressing a tenderness of feeling which this new and closer sympathy with nature had developed. He is known to us chiefly by his heroic statue of Hermes carrying the infant Dionysus, discovered at Olympia in 1879, and the sweetness and delicate grace of his style are particularly displayed in the statue of Ceres discovered at Cnidus, and now in the British Museum. The beautiful statue of the Venus of Milo, now in the Louvre, is of the school of Praxiteles. The celebrated group of Niobe and her children, the work either of Praxiteles or Scopas (see Plate II, fig. 5), also belongs to this period, as does the bronze figure of Narcissus in the Naples Museum. The increasing study of physiognomy resulted in a naturalistic school of portraiture, at the head of which stands Lysippus 340 B.C. He is specially celebrated for his many portraits of Alexander, and some idea of the excellence of his work is to be gained from the head of the monarch preserved in the Capitol at Rome.

From the death of Alexander, B.C. 323, onwards to the conquest by the Romans B.C. 146, the progress of Greek sculpture was but a naturalistic development tending to a decline. Familiarity with the forms of nature, and power to express minute movement and gesture, gradually brought the art from its higher level to depict the incidents and feelings of common life, and we find sculpture increasingly eager to interpret intense and momentary suffering. From the school of Rhodes we have the celebrated group of the Laocöon in the Vatican, and the colossal group of the Toro Farnese (Farnese Bull) in Naples. To this period must also be assigned the Fighting Gladiator now in the Louvre, the Venus de Medici at Florence (see Plate II, fig. 2), the Apollo Belvedere in the Vatican (fig. 1).

Italy, Roman.—The history of sculpture in Italy is only a continuation of its story in Greece. It was Greek art produced by Greek workmen that, either compelled as slaves or invited as artists, adorned the palaces of the emperors, and Roman sculpture, in so far as it could be said to have any independent existence, can only claim to have impoverished the ideal received from Greece. There was an earlier manifestation of Etruscan art that was indigenous and independent (see Plate I, fig. 7), and all early Roman sculpture was entirely the work of Etruscan artists, but seeing that Greek influence speedily made itself felt throughout Italy, we have no means of determining whether Etruscan art could ever have developed itself to maturity. Many well known works were produced in the Græco-Roman period, and we may instance the Dying Gladiator in Rome (fig. 7),

the Farnese Hercules at Naples, the beautiful group of Merope and Ægyptus, of the Villa Ludovisi, at Rome (fig. 6), and also the Column of Trajan. From the time of Hadrian (A.D. 138) art rapidly declined, and on the removal of the seat of the empire to Byzantium, by Constantine, most of the finest statues accumulated in Rome were removed there, only to be lost for ever, either by the plundering of wars, or the fanatical rage of the Christian iconoclasts. With the introduction of Christianity, sculpture, like its sister art of painting, reverted again to a religious symbolism, though of another order than that which held it in bondage in Egypt and Asia, and a debased Roman style was followed by the Byzantine and Romanesque sculptors until the revival in the twelfth century.

Renaissance.—But if Italy witnessed the decline of sculpture, it was also the first to greet a modern revival of the art. For the birth and growth of the modern sculptor's art we must go direct to Italy, and study those artists who, in their efforts to recreate a fallen craft, not only were the first to perceive the value of antique art, but were the only artists who had the opportunity of studying its remains. The spirit of the modern sculpture is distinct from the spirit of the antique, but the handicraft had to be acquired, and for this purpose a knowledge of Greek or Roman work was almost indispensable. The progress of Italian painting, especially in the earlier stages of its growth, was in large measure dependent upon the earlier excellence of Italian sculptors. For a considerable period sculpture, both in feeling for beauty and in mastery over the delineation of form, was quite a century ahead of the sister art, and for this reason its history is of the utmost importance in the general record of modern culture. Although the art had been for some time slowly growing, the first Italian sculptor of note was Nicola Pisano, who was born at Pisa about A.D. 1206. He was an architect as well as a sculptor, and we may discern in his work, preserved in the pulpits which he carved at Pisa and Siena, a return to and an adaptation of the purer forms of the antique. It was Italian sculpture, in fact, that by its assimilation of the truth of antique art led Italian painters of the sixteenth century to the same inexhaustible source of beauty. Nicola Pisano had a number of pupils who followed closely in his style, notably his nephew, Andrea Pisano, who assisted Giotto, but it was to his son, Giovanni Pisano, that we must attribute the next step in advance. From his sculptures adorning the façade of the cathedral at Orvieto we perceive that the art was already so far developed as to be able to attempt the illustration of a complex series of events, but its growing intellectual freedom and flexibility are still more decisively marked in Giovanni's allegorical group in the Campo Santo of Pisa. All these foregoing artists executed works decorative in character, following in ever diminishing strictness the laws of classic treatment, but one of the first masters, and, in fact, the founder of the modern school, whose all pervading motive was a return to the study of nature and in which sculpture began to have an independent existence, was Jacopo della Quercia, of the Siennese school (1371-1438), whose beautiful reliefs adorning the façade of the Basilica of San Petronio at Bologna show a feeling for grace not before expressed. He heads the strong school of Siena, among the pupils of which were Vecchietta and Civitate. In the works of his contemporary, Lorenzo Ghiberti (1381-1455), chiefly remembered by his bronze gates to the Baptistery at Florence, a more pictorial style is developed with extraordinary success, but sculpture awaited the advent of Donatello (1386-1468) in order to find its true direction, and to reach its fuller

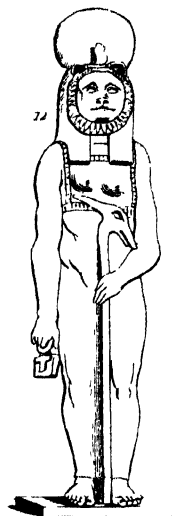
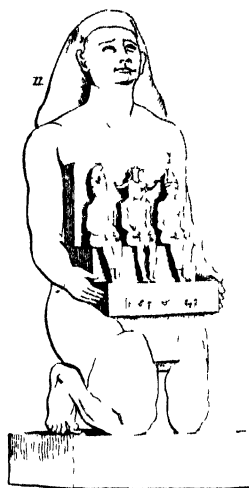
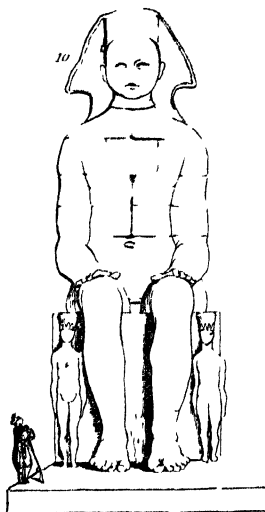
triumph. This artist began his career by a close and earnest study of the antique, and when this preliminary mastery of the laws of his craft was complete he was able to give exercise to his own invention within the sure limits of graceful design. His marble statue of St George, outside the church of Or San Michele in Florence, is one of the very finest works of modern sculpture. With his name must also be mentioned that of Luca and Andrea della Robbia (1400-81), chiefly remembered by their terra cottas, and we may add as an illustrious follower of Donatello, Andrea Verrocchio (1432-88), the master of Leonardo da Vinci, whose equestrian statue of Coleoni in Venice might fitly serve as a model to all succeeding sculptors. Mino da Fiesole (b 1430) and Benedetto da Majano (b 1442) have also left works in Florence, chiefly of a decorative character. All these architect sculptors are of the Florentine school. The art was now thoroughly established not only in Tuscany, but in all parts of Italy, and many names that would well deserve consideration must be omitted, in order to proceed at once to the greater masters who represent the final development of the Italian school. First and foremost comes Michael Angelo (1475-1564), in whose work all foregoing efforts and tendencies are consummated. He stands between the group of architect sculptors and the statue makers of the sixteenth century, with whom art declined. As a workman he has never been excelled, and his figures, whether in painting or sculpture, equal both in their conception and in their execution the highest efforts of the classic artists. They are reserved, as all great works of art must be, but beneath this reserve is the fullest record of passion and movement that art has ever forced into human form. It was towards this complete understanding of the resources of physical expression that all Italian art had been tending, and it is fully exhibited in Michael Angelo because he was the greatest master that Italy or the world has produced. His finest sculptured work, carved generally direct in the marble, is to be found in the tomb of the Medici, and the colossal David in Florence, in the two slaves in the Louvre, originally designed for the tomb of Pope Julius, and in the colossal figure of Moses in Rome for the same monument. Among other great masters of Italy must be mentioned Benvenuto Cellini, who worked largely in metal (1500-72), Baccio Bandinelli (1487-1559), Jacopo Sansovino (1477-1570), and notably Giovanni da Bologna (b 1524), whose Rape of the Sabines and Mercury are in Florence. For a long period after Michael Angelo, Italian sculptors were content to imitate, and sometimes to exaggerate, his manner. Lorenzo Bernini (1598-1680), the master of the 'baroco' style, exemplifies the excesses of the modern spirit in his extravagant and often repulsive treatment of subjects of passion or suffering, and in a straining after grace and elegance by means of affectation. In the eighteenth century Italy became the head quarters of the classical revival which spread thence throughout Europe. The leading spirit in this movement was Canova (1757-1822), who, although he failed to restore to his art its earlier masculine strength, at least sought in the study of the antique for greater simplicity and elegance in representation. He produced much that is graceful and fascinating, and he combined in a manner peculiar to himself a reminiscence of antique grace, with a feeling entirely modern (see Plate III, figs 22 and 25). His most characteristic works are the Graces, the Hebe, and the Cupid and Psyche (all well known), but his finest work is the colossal group of Theseus slaying a Centaur at Vienna. Canova formed Thorwaldsen, the great Danish sculptor, and his name and influence dominated the art of sculpture throughout Europe for many years.

His pupils were Tenerani and Giacometti, and among later sculptors occur the names of Bartolini and Dupré. Since Canova the history of Italian sculpture has scarcely been separable from the history of sculpture in other European nations. Italy, and notably Florence and Rome, has become the home of European sculptors. Italian sculpture has now a strong bias towards realism, the chief exponents being Monteverde, Gallori, and Barzaghi (died 1892), though Albano and Fedè (died 1892) form exceptions.

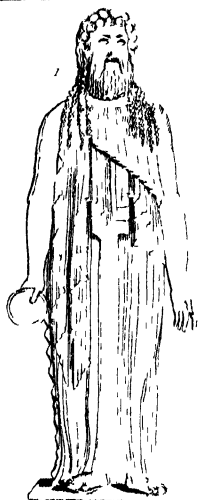
France—The early art of France was influenced by the then prevailing styles. Thus the sculptures of her cathedrals show Byzantine, Romanesque, and Gothic influences, the finest examples in this last being at Amiens. Awakening in the fifteenth century it produced as precursors of the renaissance Bouteiller and Colombe (1431-1514), and in the sixteenth century Jean Goujon (1530-72), the founder of the modern school, whose best work is the Fountain of the Innocents in Paris, and whose Diana in the Louvre shows all the faults and beauties of his style. He was specially happy in his treatment of bas relief. His work and that of his school was a following with French feeling of the mannered style of the later Italian artists and is stamped with something of an artificial grace. Other sculptors of this period and of this style are Germain Pilon (1515-90), whose monumental sculpture enriches the church of St Denis, Jean Cousin (1501-89), also a monumental sculptor, and Barthélemy Prieur (died 1567). At a later time the influence of Bernini made itself felt in France, and may be traced in the spirited but mannered work of Pierre Puget (1622-94), Coysevox (1640-1720), and Girardon (1630-1715) continued the style, which, whilst aiming at elegance and grace, lost simplicity and roundness, but a lighter and more characteristic elegance is illustrated in the work of René Fremin (1674-1744). The chief masters of the eighteenth century are Bouchardon (1698-1762), Pigalle (1714-85), and Antoine Denis Chaudet (1763-1810). This last named artist, the contemporary and companion of Canova at Rome, revived in the French school the study of the antique. The Danish school, which produced Thorwaldsen, owes its rise to French influence. Later yet come Houdon (1741-1828), Bono (1769-1845), Rude (1785-1855), Pradier (1792-1852), Barye (1795-1875), a sculptor of animals, and Carpeaux (1827-1875), whose chief work *La Danse* is in front of the new Opera house in Paris. Among more recent artists are St Marcœur, Frémiet (animal), Falguière, Mercie, Dalou, Rodin, Bartholdi, Chapu (monument to Gambetta), Boucher, and Dubois (monument to General Lamoricière), who form a school that has always kept its national style and feeling. Its characteristics are an intense feeling after nature, coupled with technical execution of the highest order, and its position is the foremost and its life the most vital in Europe.

Germany—There was no early school of German apart from the general Gothic style of all northern European countries, but with the renaissance of the fifteenth century arose Adam Kraft (1480-1507) and Peter Vischer, two contemporary sculptors of Nuremberg, and Albert Dürer (1471-1528), painter and sculptor. Carving on a small scale, whether in wood or stone, seems to have had a special attraction for the German artists of the earlier period, and several examples of Dürer's skill in this direction still survive. One of these carvings in the British Museum is of the utmost delicacy of workmanship. Kraft was the first to work in stone, as Vischer did in bronze. Then came a break, owing to the influence of the Reformation, until the rise of the modern

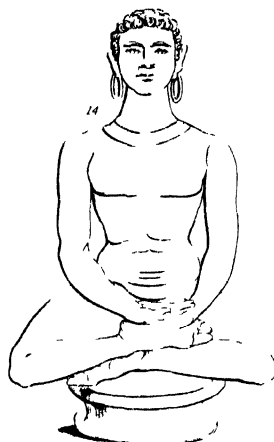
SCULPTURE—I EARLY VARIETIES



EGYPTIAN



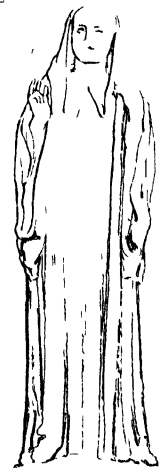
GREEK



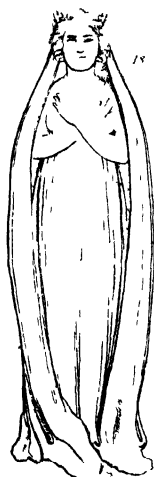
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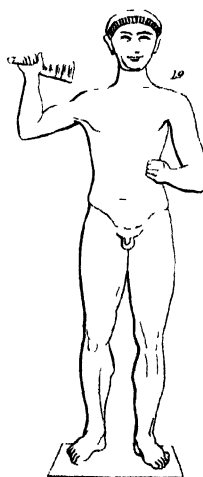
PERSIAN
From Persopolis



From Peterborough ENGLISH
Cathedral



From York
Cathedral



EARLY GREEK
of the Dadaelon School

SCULPTURE--H GREEK



APOLLO BELVIDERE



VENUS DE MEDICI



ATHENA



TORSO OF HERMES



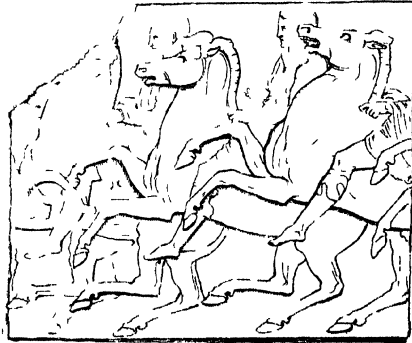
NIKE



LAOCOENUS & SONS



THE DYING GLADIATOR

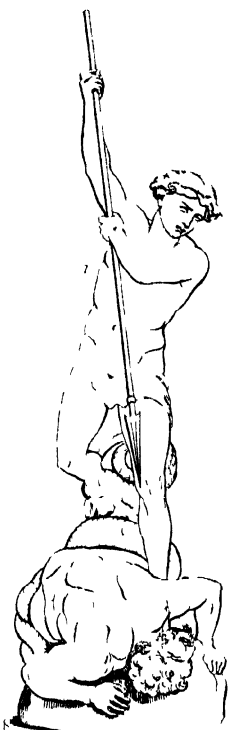


ELGIN MARBLES FROM THE PARTHENON ATHENS

SCULPTURE—III MODERN



THE FORTUNE TELLER



MICHAEL AT THE ALTAR



ANNA VINI



PAUL BARNUM



THE FORTUNE TELLER



BENEDICTINE — CANOVA



THE DISTRESSED MOTHER — WESTMACOTT

SCULPTURE-IV MODERN



VENUS GIBSON



SAPPHO FLAXMAN



VRGINITY MAC DOWELL



AMA ON FLAXMAN



VICTORY RAUCH



NIGHT SCHILLING



CARACACUS POLEY

school, which owes its existence to the influence of Thorwaldsen (1770-1844). The chief names are Dannecker (1758-1841), with his *Aradne* now at Frankfurt, and Schadow (1764-1850), with *Girl tying her Sandal*. Rauch (1777-1857) was, however, the real founder of the modern German school. His monument to Frederick the Great at Berlin, with its many accessory figures, is his finest work, and from his school came Rietschel (1804-60), Schwanthaler (1802-48), August Kiss (1802-65), Bandel (1800-76), and Drake (1805-82). Schilling is the most noted among the living sculptors of Germany.

Spain—The Spanish school of the Renaissance was only an offshoot from the Italian. The chief names are Berraquete (1503-1561), Bercerra (1520-1570), and Montanes (d. 1650).

Flanders—Holland has absolutely no school of sculpture, but Flanders could boast sculptors almost equal to those of Germany. Particular mention should be made of some Gothic monuments in Bruges, and of a wonderful chimney piece in the same city.

No other European nation can rank with Italy, France, and Germany in the earlier stages of art progress, but in modern times Denmark, England, and the United States have taken notable places. The first by the possession of Thorwaldsen, whose career, however, belongs rather to Rome than to his country, must necessarily occupy an important position in modern art history. Thorwaldsen like Canova, based his style upon the antique, but his invention was of a more masculine order, and his productive powers more remarkable. His chief works are at Copenhagen.

England—Of examples of sculpture executed before the eighteenth century England possesses very few. Several tombs exist, and some of our cathedrals, notably Wells, Exeter, York, and Lincoln, possess figures executed presumably by Englishmen (see Plate I, figs 17, 18), those of Wells being of the latter half of the thirteenth century. William Torel (1291) executed three recumbent statues of Queen Eleanor, and William Austin was the sculptor of the bronze figure of Earl Beauchamp in Warwick. In 1512 Pietro Torrigiano of Florence came to London, and stayed for six years. For more than a century after this sculpture lay dead in England, and it was not until the reign of Charles I that names of artists appear, notably among them being Nicholas Stone, whose work is to be found in Westminster Abbey (1586-1647), and Grinling Gibbons (1648-1721), who, though chiefly known by his carvings in wood, was the first real artist of the English school. Joseph Wilton was the forerunner of the school which produced Banks and Flaxman. Banks (1735-1805) is the father of ideal English sculpture, but died unappreciated. His work is little known to the general public, but his bas-relief of *Thetis rising from the Sea to console Achilles* is in the hall of the National Gallery. Next in order of time come John Bacon (1740-99), an artist of considerable talent, chiefly devoted to portrait sculpture, and Joseph Nollekens (1737-1823), but it rested with John Flaxman (1755-1826) to achieve that which Banks had failed to do, namely, the task of bringing the classical spirit into English art, and founding the early school of the nineteenth century. The young sculptor was in 1769 admitted a student of the Royal Academy. In 1787 he went to Rome, where he remained for seven years, attracting great notice both from his own countrymen and from foreigners. On his return to England academic honours came rapidly enough, and in 1800 he was elected a full member. His love for severe simplicity and true form was imbibed in Rome, and is best seen in his *Shield of Achilles*, in his *Michael over*

coming Satan (see Plate III, fig 21), and his *Cephalus and Aurora*. He greatly assisted Wedgwood in the design and decoration of his pottery, and executed a number of beautiful designs in outline illustrative of Homer and of Dante. His most famous pupil was Baily (1788-1867), whose *Eve at the Fountain* (fig 24) was much admired. Sir Francis Chantry (1788-1841) worked chiefly on portrait figures and busts, and did much to form a sound style of portrait sculpture. His monument to James Watt (fig 23) must always take rank as one of the great works of the English school. John Gibson (1791-1866), a pupil of Canova, more properly belongs to the Italian than the English school, his whole artistic life having been passed in Rome. The influence of the great Italian artist left a permanent mark upon Gibson's style, but in the expression of feeling Gibson showed always a greater reserve, which brings his work nearer to the spirit of the antique. His finest works are *Psyche borne by Zephyrs*, the *Narcissus*, *Hylas Surprised by the Water Nymphs*, and a large relief of *Christ blessing Children*. The *Hylas* is now in the National Gallery. His introduction of colour in statuary raised much discussion. We may also mention, as belonging to this period, L. Watson (1804-47), and Sir Richard Westmacott (1799-1856) chiefly known as a monumental sculptor. Foley (1818-75), whose *Caractacus* and equestrian statue of *General Outram*, at *Alcutta*, are very notable, and Patrick Macdowall (1799-1870) (*Virginius* and *Love Triumphant*), are the last names of the classic school (see Plates III and IV). Alfred Stevens (died 1875) is the author of the finest decorative work in England, the monument of the Duke of Wellington in St Paul's, London. He stands apart, and is the one man to whom living English sculptors owe the first possibilities of a great British school of sculpture. His style is founded upon a study of fifteenth and sixteenth century Italian art, and his work is marked with a dignity and breadth which bring it very near that of the best of the Italian masters. The tendency of sculpture in England at the present day is, like that of French art, by which it has been powerfully influenced, towards a more original and naturalistic treatment. Among the more distinguished of our own day are Woolner, Thornycroft, Gilbert, Brock, Onslow Ford, and Leighton, whose works, with those of some younger men, go far to give English sculpture a high place among European nations. An extremely healthy sign is the ever increasing demand for sculpture for architectural purposes, and the majority of the young sculptors are turning their attention to this most essential branch of art work.

America—American sculpture is entirely due to Italian influence exercised over Americans working in Italy, Italian art in Italy finding its purest and best expression at the hands of American and English artists. Chief among the sculptors of the United States are Crawford, Akers, Hiram Powers, known by his *Greek Slave*, W. W. Story, Miss Hosmer, Gould, Ball, Couper, Mackay, and St Gaudens, this last named working entirely in America.

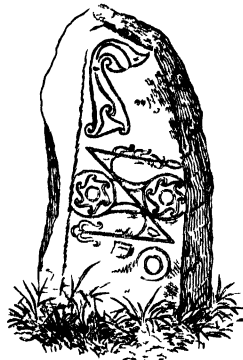
The published works on sculpture are so numerous that we can mention only a few. *The History of Sculpture*, by Wilhelm Lübke (1880) embraces the whole subject, and is written with learning and impartiality. Winckelmann's *History of Ancient Art* (German, 1776, English, 1850) deals comprehensively with Greek sculpture. For the history of Italian sculpture Perkin's *Tuscan Sculptors* (2 vols, 1864), and *Italian Sculptors* (1868) should be consulted, and for the record of French sculpture, in its earlier stages, the work of Eméric-David (1853) is a valu-

able assistance. See also Vogé's *Die Anfänge des Monumentalen Stiles im Mittelalter* (1894), Gonse's *La Sculpture Française depuis le XIV^e Siècle* (1895), and Franz's *Skulpturen der Neuzeit* (189 plates, 1896-97), all dealing with French sculpture. Besides the individual biographies of English artists, we may mention Flaxman's *Lectures and Westminster's Handbook*, and among more modern works, A. G. Murray's *History of Greek Sculpture* (two vols., 1890), *Ancient Sculpture* by Redford (1886), *Renaissance and Modern Sculpture* by Leader Scott (1886), and *Introductory Studies in Greek Art* by Jane E. Harrison (1885).

SCULPTURED STONES, ancient monuments with sculptured ornaments or devices, sometimes with inscriptions, found in the British Islands. Some of the inscriptions are in debased Latin. A good example of this class, called the *Celtic Stone*, is found in the parish of Kirkcubbin, near Edinburgh. It is a monolith, composed of a large boulder of trap about 4½ feet in height, with an imperfect inscription which marks it as a sepulchral stone. Another was observed by Sir Walter Scott in Yarrow, Selkirkshire, also a *huc jacet* with an incomplete inscription. But the most remarkable stone of this kind is a granite monolith at Newton, Aberdeenshire, with a tolerably well preserved inscription, which has completely baffled the antiquaries. General Vallancy read the first two lines *Gylf Gomarra*, but of the rest of the inscription he was able to make nothing. It was submitted to Dr. Mill, professor of divinity in the University of Cambridge. Dr. Mill took the language to be Phœnician, and read it from right to left. His interpretation was 'To Eshmun, God of Health, by this monumental stone may the wandering exile of me, thy servant, go up in never ceasing memorial, even the record of Him Thannit Zennith Magistrate, who is saturated with sorrow.' Dr. Mill wrote a long dissertation in support of this inscription, which was read at the meeting of the British Association at Cambridge in 1862. Mr. Wright, the secretary of the section, said that from a not very accurate drawing which he had only seen since he came on the platform, he could discover that the inscription was not Phœnician but Roman, and that he could decipher on it the words '*huc jacet Constantinus filius*'. Other scholars have pronounced that the inscription is Greek, and Captain Sykes found an affinity in the characters to the Lat. Alphabet of the Buddhists. There is also on the same stone an Ogham (see **OGHAM**) inscription. The most recent attempt at the explanation of both is by the distinguished Celtic scholar Whitley Stokes, in the *Academy* of June 4, 1892. He makes them out to be commonplace inscriptions in a Celtic (Pictish) dialect.

Another class of sculptured stones of a still more remarkable character occurs exclusively in the northern Lowlands of Scotland, the last resort of the Picts to whom they are generally attributed. Their situation and their absence on the western coast seem to preclude an Irish origin, especially as none are found in Ireland, or any other part of Britain. They were long supposed to be of Scandinavian origin, but none appear in Norway, Sweden, or Denmark. The peculiarity of these stones consists in certain symbols, supposed to be of religious character, but of which nothing certain is known. The accompanying engraving of the *Dunnichen stone* will give a general notion of the leading features of some of these recurring symbols. These symbols have been named from the resemblance of their forms to known objects, as the conjoined circles or spectaclled symbol, the Z symbol, which two are generally found in combination, the serpent occurs

both alone and intertwined with the Z symbol, the crescent and V symbols are also frequently combined, so are the comb and mirror, which are conjectured to represent sex or virginity. Among other symbols represented in different stones is a form which appears to be that of an elephant, but is also



claimed as a walrus, others representing a bird, a fish, a horse shoe, &c. These stones are divided into two distinct classes: an earlier, in which the symbols appear on unhewn stones, a later, in which they are accompanied with the sign of the cross, and combine with purely ornamental sculpture. It is hence assumed that the symbols were originally pagan but were adopted in spirit of accommodation by the early Christians on

their monuments. The symbol near the top of the *Dunnichen stone* has been found in a silver plate among the relics discovered at Norrie's Law, Fifeshire, where it assumes distinctly the form of a dog's head. A bronze mirror, similar in shape to the one which appears on the stone, was also found at Balmacellan, New Galloway, along with some elaborate bronze ornaments. Oghams are also found in conjunction with some of the stones.

SCUPPER HOSE, a leathern pipe or tube nailed round the outside of the scuppers of the lower decks, and which by hanging down, prevents the water from entering when the ship inclines under a pressure of sail.

SCUPPERS, certain channels cut through the water ways and sides of a ship at proper distances, and lined with sheet lead, in order to carry the water off the deck into the sea.

SCURVY, a disease due to a chemical alteration of the blood, which has its cause in the absence from the diet of a sufficient quantity of fresh vegetable food. It is a disease, therefore, which, given the condition named, may occur anywhere, and among any race. But the circumstances under which the condition has most opportunity of arising are those of war, famine, and shipwreck, or prolonged sea voyages. Thus, up to the date of the Crimean war it was a most serious foe to an army in the field, and in the last British expedition towards the North Pole its occurrence was one of the chief causes of failure. It has occurred in prisons before the necessity of a varied diet was properly understood. It is now well understood that the absence of fresh vegetable food is the invariable antecedent of scurvy, and thus its prevention is secured. It has been found, moreover, that where it is impossible to secure a supply of such food, the use of lime or lemon juice will certainly act as a preventive. This sea-going ships are compelled by law to carry, and so the disease has almost disappeared from the British navy and British mercantile marine. The disease comes on gradually, with heaviness, weariness, and unwillingness to move about, together with dejection of spirits, considerable loss of strength, and debility. As it advances in its progress the countenance becomes sallow and bloated, respiration is hurried on the least motion, the teeth become loose, the gums are spongy, the breath is very offensive, livid spots appear on different parts of the body, old wounds, which have long been healed up, break out

afresh, severe wandering pains are felt, particularly by night, the skin is dry, the urine small in quantity, and the pulse is small, frequent, and towards the last intermitting, but the intellect, for the most part, clear and distinct. By an aggravation of the symptoms the disease in its last stage produces a most wretched appearance. There is extreme debility, the patient's voice is exceedingly weak, and he often shows a marked liability to fainting attacks. On this account, in extreme cases, the patient must be kept and fed in the recumbent position till strength has been to some degree restored. Scurvy as usually met with on shore does not usually present the same severe symptoms. Slight blotches, with scaly eruptions on different parts of the body, and a sponginess of the gums, are the chief ones observed. In the cure, as well as the prevention of scurvy, more is to be done by regimen than by medicines, particularly providing the patient with a more wholesome diet, and a large proportion of fresh vegetables, and it has been found that those articles are especially useful which contain a native acid, as oranges, lemons, &c. Where these cannot be procured various substitutes have been proposed, of which the best appear to be the inspissated juices of the same fruits, or the crystallized citric acid. Fresh animal food must not be omitted if the patient can eat it, and stimulants may in small doses be needful to combat prostration. The most useful article, both as a preventive and as a curative, is lime or lemon juice. Three to four ounces should be given per day as a drink, in about a pint and a half of water sweetened to taste.

SCURVY-GRASS (*Cochlearia officinalis*), a cruciferous plant, growing in this country on the sea shore and high up on the mountains. It is common also on the shores of Greenland, Iceland, and the north of Europe. The leaves are small, reniform, entire or sinuate, but variable in shape, the pouch globose, ovate, or elliptical. It has long been esteemed for its anti-scorbutic property, and hence its name. The leaves are slightly pungent, and are sometimes used as a salad.

SCUTARI, a town of Asiatic Turkey, on the Bosphorus, opposite Constantinople, of which it is sometimes considered a suburb. It is built on several hills, and contains numerous mosques, fine bazaars and batha, and many inarets or kitchens for the poor, mostly endowed by royal personages. It has also a palace and gardens belonging to the sultan, large grain warehouses, manufactories of silk and cotton fabrics, and the most extensive and beautiful burying grounds in or around the capital of the Ottoman Empire. Pop 82,500.

SCUTARI, a town of European Turkey, in the province of the same name, in Albania, near the southern extremity of the lake of same name. It is fortified, and has two castles, a large bazaar, several mosques, and Greek and Roman Catholic churches, some ship building yards, and manufactories of cotton goods and fire arms. It exports, wool, wax, hides, skins, tobacco, and dried fish to Trieste, Venice, and Avlona, and imports colonial produce, silk fabrics, and other manufactured goods, for sale at the large fairs of Turkey. The fishery on the lake constitutes another branch of industry. Pop 25,000.

The lake of Scutari, on the frontiers of Montenegro, is about 18 miles long from N N W to S S E, and 6 miles wide. It contains several small islands, receives several streams, the largest of which is the Moracca, which joins it on the north west, and discharges itself by the Bojana into the north side of the Gulf of Drino, in the Adriatic.

SCUTTLING, the act of cutting large holes through the bottom, sides, or decks of a ship, for various occasions, particularly when she is stranded

or overset, and continues to float on the surface, in order to take out the whole or part of the cargo, provisions, stores, &c.—To *scuttle a ship*, to sink her by making holes through her bottom.

SCYLLA, a rock in the Strait of Messina, on the Italian side between Italy and Sicily, nearly opposite Charybdis. Various legends were associated with these rocks, which were esteemed highly dangerous to navigators. According to Homer Scylla, daughter of Crataeis, lived in a cave in the rock which corresponds with her name. She was a monster with twelve feet and six heads on six long necks, each with three rows of sharp teeth. Under a fig tree on the opposite rock dwelt Charybdis, who every day swallowed the waters of the sea three times, and as often vomited them up again. This legend was afterwards embellished. One account represented Scylla as a beautiful maiden who used to play with the sea nymphs, and who was loved by the sea god Glaucus. He applied to Circe to aid him in his suit, but she became jealous of the maiden, and threw magic herbs into a well in which Scylla was accustomed to bathe, by means of which the lower part of her body was changed into a fish surrounded with dogs, which terrified her with their barking, so that she threw herself into the sea. Scylla was also a daughter of Nisus, king of Megara, who fell in love with Minos, and delivered to him her father's capital. See **NISSUS**.

SCYTHIANS. This name was very vaguely used by ancient writers. It was sometimes applied to a particular people, and at others was extended to all the nomadic tribes which wandered over the regions to the north of the Black and the Caspian Seas, and to the east of the latter. Scythia is used in the same indefinite manner, sometimes for the country of the Scythians, and sometimes for those now called Mongolia and Tartary. The Scythians may be distinguished into Asiatic and European. Among the former the ancients included a great number of northern nations, with whose origin they were unacquainted, and who were probably of different races. The Scythians were for some time a ruling people in Asia. They are considered as the progenitors of the Turks, Tatars, and Manchus the ancients considered the Persians, Parthians, and Bactrians as their descendants. The European Scythians, in the time of Herodotus, inhabited the country from the Ister (Danube) to the sources of the Dniester and the Dnieper, in the neighbourhood of the Don, and along the northern shores of the Black Sea. Of this region that portion extending from the Danube to the city of Carcinitus was called Old Scythia, and the peninsula (Taurida) to the Borysthenes was called Little Scythia, which name in Strabo's time included the country as far as the Danube, formerly occupied by the Thracians, and therefore comprised Old Scythia. The Scythians of Herodotus were Mongolians. They correspond with the modern Slavonians. They were anciently a nomad race. They were divided into hordes, the chief of which was called the Royal Scythians. To this horde all the others paid a sort of allegiance. In the time of the Roman Empire the name Scythian included the whole of the Mongol race, and extended over Northern Asia from the Volga to the frontiers of India. The people of this region, being little known, were the subject of numerous fables.

SEA. See **OCEAN**.

SEA ANEMONE (*Actinia*), a genus of Coelenterate animals, found plentifully represented on the British coast, and forming at once the type of the class Actinozoa and of the group Actiniaria. The sea anemones are probably the most familiar organisms met with on the sea beach. The name has been

applied to them from a rough resemblance that some species may possess to the flower of the same name, the term 'sea flowers' being also bestowed upon them for a similar reason. Southey, amongst other poets, has written of the Sea anemones that—

"Here too were living flowers,
Which like a bud compacted
Their purple cups contracted,
And now in open blossom spread,
Stretch'd like green anthers many a seeking head"

Whilst the presence of the anemones has given rise to the same ideas on the part of other poets, who have said that—

"Seas have—
As well as earth—vines, roses nettles, melons,
Mushrooms pinks, gilliflowers, and many millions
Of other plants, more rare more strange than these,
As very fishes living in the seas"

Each Sea anemone, however varied its coloration or form, presents the essential structure and appearance of a fleshy cylinder, attached by its base to a rock or stone, and presenting at its free extremity the mouth, surrounded by a circlet of arms or tentacles. The walls of this cylindrical body consist of two layers, seen in all Coelenterata, and known as the *ectoderm* (outer) and *endoderm* (inner layer), whilst the former layer may exhibit a tendency to become divided into two distinct sets of fibres, the outer of which is known as the *calicium* and the inner as the *endoson* (see SCIERODERMIC CORAL). In addition to these two primary layers of tissues seen in the Sea anemones, muscular fibres are also developed, and both longitudinal and circular muscular fibres may thus be present, by aid of which the characteristic contraction of the bodies of these animals is effected. The mouth leads into a stomach-sac, which, however, is imperfectly specialized, in that it is open inferiorly, and communicates freely with the rest of the body cavity. This stomach sac is kept in its place and connected to the walls of the body by a series of vertical lamellae or plates, which run between the stomach sac and body wall, and which are known as *mesenteries*. In the Sea anemones these mesenteries, together with the tentacles, exist in multiples of five or six, and divide the space between the stomach and body walls into a corresponding number of *loculi* or chambers. The reproductive organs are borne upon the vertical faces of these mesenteries, in the form of reddish band like masses, representing ovaries or female elements, and spermaria or male reproductive organs. Most of these forms are dioecious, that is, having the sexes situated in different individuals.

The tentacles of the Sea anemones are organs of simple, tubular, and unbranched structure, which communicate internally with the body cavity, and are perforated at their tips. They may be very numerous, in some cases exceeding 200 in number, and are in most cases capable of being retracted within the body when the animal is irritated. In some genera (*Anthea*, *Ceranthus*, &c) the tentacles are permanently extended. A vacant space, named the *peristomial space*, exists between the bases of the tentacles and the mouth, and around the margins of the oral disc certain bodies, containing pigment and crystalline lenses, and presumed to have the function of eyes, are generally to be seen. No distinct nervous system has been demonstrated to exist in any Actinia, although some observers have maintained the existence of so called *optic nerves*, distributed to the pigment cells just mentioned. No heart or circulatory apparatus exists, although a circulation of the fluids in the interior of the body is carried on through the currents created by the *cilia* which line the endoderm. A generalized idea of the structure of a Sea-

anemone may, in fact be gained, by supposing that the animal in transverse section represents a double tube, the outer tube will correspond to the body-walls, and the inner tube to the stomach sac.

The mesenteries exhibit a division into three groups. Those which connect the stomach with the walls of the body are named *primary* mesenteries, and those which arise from the body-wall, but do not reach the stomach, are termed respectively *secondary* and *tertiary* mesenteries, according as they are longer or shorter. At their free or internal edges the mesenteries bear peculiar organs, consisting of convoluted cords, known as *craspeda*, and which are abundantly furnished with *thread-cells*. These latter cells are vesicles found in the tissues of all Coelenterates, and which form urticating or stinging organs adapted for paralyzing the prey. The *craspeda* are believed to have an offensive function, and to be protruded from the body through special apertures existing in the body walls, and termed *cinclides* by Gosse. The mesenteries themselves are longer than the stomach-sac which they connect with the body walls, and their edges below the stomach are therefore free, and curve at first outwardly, and then downwards and inwards, and are so attached to the centre of the floor or base of the body.

The Anemones feed upon Crabs and other Crustacea, Molluscs, such as whelks, &c, and other animals which happen to come within reach of their outspread tentacles, and which are paralyzed by the thread-cells. During the digestion of food it would appear that the inferior aperture of the imperfect stomach sac, by which it opens into the body cavity below, is temporarily closed by the margins of the aperture being brought into apposition by muscular contraction. When fully expanded the appearance of the Anemones in all their varieties of colour is exceedingly beautiful. But upon the slightest touch the tentacles can be quickly retracted within the mouth-aperture, the fluids of the body are expelled by the mouth, and the animal, from presenting the appearance of a fully expanded flower, becomes a conical mass of jelly like matter, altogether irreconcilable in appearance with its former state, which, however, it will soon assume if left undisturbed. Although these forms are attached to rocks and fixed objects, they appear able to detach themselves at will, and when kept in aquaria they may be observed to move across the glass by contractions of the muscular base or disc by which they are attached. Some genera (such as *Peachia* and *Edwardina*) are not firmly fixed to stones, but simply bury their roots or discs in mud and sand. In some cases (as in *Peachia* and *Ceranthus*) the base or disc of attachment may be perforated in its centre, although the reason for this perforation is unknown.

The Anemones appear in their embryo state as free swimming ciliated bodies of an oval shape, the mouth first being indicated by a depression at the broader extremity of the ovate body, and the stomach-sac being formed by a fold which grows inwards from the oral orifice. The body layers are also differentiated, and the characteristic thread-cells appear in the ectoderm or outer layer. The tentacles at first exist as a single row five or six in number, but soon increase in multiples of these numbers, until the numerous tentacula of the adult are developed. The young may also frequently be seen to escape from the mouth and body cavity of the parent in a small but fully developed state, having undergone development within the parent body.

The genera, species, and varieties of Sea-anemones, represented on the British coasts alone, would form material for a large treatise—as is evinced by the laborious care expended by Mr Gosse in his

Actinologia Britannica—or History of British Sea Anemones, to which work the reader may be referred for copious details regarding the different members of the Anemone family, as well as for abundant and beautiful illustrations. The *Actinia Mesembryanthemum* is the common species found on the British coasts, and appears generally of a crimson hue, whilst of this typical genus, the *A. crassicornis*, *A. gemmacea*, and *A. rosea*, &c. are other familiar species. According to a recent classification the group Actiniaria is divided as follows: Section I, Hexactiniae, comprising the families Corallimorphidae (genera *Corallimorphus*, *Aureliana*, &c.), Minyadidae (genera *Minyas*, &c.), Anthemorphidae (genus *Anthemorphus*), Actinimidae (genera *Actinia*, *Bolocera*, &c.), Alciidae (genera *Alcia*, &c.), Bunodidae (genera *Bunodes*, *Cereactis*, &c.), Paractidae (genera *Paractis*, *Paractinia*, &c.), Amphianthidae (genera *Amphianthus*, &c.), Sagartidae (genera *Sagartia*, *Cereus*, *Actinobola*, *Adamsia*, *Giphyra*, &c.), Heteractidae (genera *Heteractis*, &c.), Sideractidae (genus *Sideractis*), Madoniactidae (genus *Madonia*), Liponemidae (all deep sea), Sarcophantheidae (genus *Sarcophanthus*), Thalassianthidae (genera *Thalassianthus*, &c.), Ilyanthidae (genera *Ilyanthus*, &c.), Siphonactinidae (genera *Peachia*, *Siphonactinia*, &c.), &c. Section II, Paractinia, comprising the families Sicyonidae (genus *Sicyon*, deep sea), Polyopidae (genus *Polyopsis*, deep sea), Section III, Protactiniae, with the family Gonactinidae (genera *Gonactinia*, *Protanthes*, &c.), Section IV, Edwardsiae (genus *Edwardsia*), Section V, Zoonthidae (usually colonial), with the family Zoonthidae (genera *Zoonthus*, *Epizoonthus*, &c.), Section VI, Cerianthidae, with the family Cerianthidae (genera *Cerianthus*, &c.). The species, though all marine, are of different habit, and include commensal and deep sea forms. The deep sea species present several peculiarities, and in particular they are almost or quite without tentacles, probably because these have fallen away. On them see the volumes of R. Hertwig in the *Challenger* reports.

The coral secretion, seen in near relations of the Sea anemones, is not developed in their own family, although in near allies it may be represented by spicula or needle like bodies of calcareous matter. The Sea anemones resemble the *Hydra* in their marvellous powers of resisting mutilation and in injuries which would inevitably prove fatal to most other animals. Thus, if a Sea anemone be divided longitudinally, a new animal will in due time be formed out of each half, and further division may only result in their artificial propagation, apparently to an indefinite degree. They appear singularly insusceptible also to the action of hot or cold water, and may be kept in aquaria for lengthened periods without any further attention than merely that of ensuring the clearness of the water. A well known instance of longevity on the part of the Sea anemone is that afforded by one named 'Granny', which was taken by Sir John Dalyell in 1828. This remarkable form lived up to the year 1887, when it died, apparently from some parasitic growth. From the time of its adoption by Sir John Dalyell, 'Granny' must have given birth to many hundreds of young. The Sea anemones are eaten as food in Italy, Greece, Provence, and on various other coasts, and Mr Gosse in his *Devonshire Coast* gives an amusing account of his attempts to introduce these forms into his domestic bill of fare.

The anemone tanks in the large aquaria seen in Brighton, Sydenham, Manchester, Southport, as well as in Berlin, Hamburg, and many Continental towns, are objects of great interest to visitors.

SEA-APE, a name sometimes applied to the Fox

shark (*Carcharias* or *Alopius vulpes*) or Thresher. See SHARK.

SEA BATHING has been found very salutary in several complaints, as diseases of the glands of all kinds, and of the skin in scrofula and a scrofulous predisposition, exhausting sweats, and tendency to catarrhs, chronic nervous diseases, particularly hysterical attacks, epilepsy, St. Vitus's dance, also sometimes in chronic rheumatism. But it must not be used in the case of plethora, inclination to congestions and discharges of blood, diseases of the heart, tendency to pulmonary consumption, obstruction and induration of internal organs. The great proportion of salt and other ingredients in the sea water, the constant motion and swell of the waves, the sea air, and the very sight of the sea, together with the excitement caused, at least in the case of timid persons, from overcoming a degree of fear, contribute to the effect of sea bathing. Machines are sometimes used for conveying patients into the water. In these, being protected from observation, the bather can enjoy the sea perfectly undressed, which is much preferable to going into the water with a dress on. See BATH.

SEA BEAR. See SEAL.

SEA CAT, a name given to the *Chimera monstrosa* or King of the Herrings, an Elasmobranchiate fish (a near ally of which is figured at Ichthyology, Plate I, fig. 8). See KING OF THE HERRINGS.

SEA COW (See MANATEE). A specimen of this animal lived in the Zoological Gardens, London, for a few weeks in 1875. Later, one lived sixteen months in the Brighton aquarium.

SEA CUCUMBER. See HOLOTHURIA.

SEA DEVIL. See ANGLER.

SEA DRAGON (*Pegasus draco*), a Teleostean fish included among the Lophobranchii (which see). The breast is very wide, and the large size of the pectoral fins, which form wing like structures, together with its general appearance, have procured for this fish its popular name. The mouth (as in the Sturgeons) opens on the inferior surface of the snout. The tail fin possesses ten strong rays. An allied species (*P. natus*) has smaller pectoral fins and a larger body than *P. draco*. The snout is also thinner than in the latter, and its colour is yellowish brown. The Sea dragon occurs in Javanese waters. The Dragonets (*Cyllionymus*), fishes of the Goby family (*Gobiidae*), are also known as Sea dragons.

SEA EAGLE. This name is applied to one or two members of the Eagle family, but probably with most distinctive value to the Circus or White tailed Eagle or Erne (*Haliaeetus albicilla*), figured at ORNITHOLOGY, Pl. III, found very generally throughout Europe. This bird is generally found inhabiting the sea coasts, and although living upon fishes, yet makes inland journeys in search of food, and seizes lambs, hares and other animals. The head is covered with long drooping feathers of ashy brown colour, whilst the body is of a dark brown hue, streaked in some places with lighter tints, and having the primary feathers of the wing mostly black. The tail is rounded, and is of white colour in the adult, but brown in the young bird. The beak, cere, legs, and toes are yellow, and the talons of a black colour. The bird breeds in Shetland and in the Hebrides. Its average size appears to be about 3 feet in length, and from 6 to 7 feet in expanse of wings. The nest is built of loose sticks. These birds are frequently captured in Norway by being attracted by a bait to the hole left in the roof of a specially constructed conical hut. When the bird alights it is jerked through the opening into the hut, and being unable to use its wings it is readily seized. The American Baldheaded Eagle (*Haliaeetus*

leucocephalus) inhabits North America, and from its frequenting the sea coasts has been occasionally named the Sea Eagle. This bird—the emblem of the United States—possesses a white head and neck, the body being coloured of a deep chocolate brown, the tail and tail coverts being also white. The white tints do not appear until the bird has attained the age of four years. This bird frequently chases the Osprey (which see) or Fish Hawk, and compels the latter to disgorge its prey of fishes. The Bald Eagle breeds in trees and lays two eggs.

SEA ELEPHANT. See SEAL.

SEA FOX. See SHARK.

SEA GRASS. See GRASS WRACK.

SEAHAM HARBOUR, a seaport in England, in the county of Durham, 6 miles S.E. of Sunderland. It has a handsome church, several dissenting chapels, an infirmary, large bottle works, an iron foundry, and an excellent harbour, provided with spacious quays and with jetties for the shipping of coal, and communicating by railway with extensive collieries. The docks are being reconstructed. Pop. in 1891, 8856, in 1901, 10,163.

SEA HARES (*Aplysia*, see illustration at MOLLUSCA), the name of a genus of Gasteropodous Mollusca, which form the typical examples of the family Aplysiada, included in that section (Opisthobranchiata) of Gasteropods in which the gills are placed towards the rear of the body. The shell is either absent or is of very rudimentary character, and is concealed by the mantle. These animals are slug-like in appearance, and derive their popular name from the prominent character of the front pair of tentacles which somewhat resemble the ears of a hare. The side lobes or epipodia of the mantle are used as fins, and are reflected over the sides and back of the Sea hares, these portions of the mantle thus concealing the shell. This latter structure, when developed, is of oblong, flexible, and transparent character. The gills are placed in the centre, and at the posterior portion of the dorsal surface or back, and four tentacles exist. Eyes are present, and are situated at the base of the hinder tentacles.

The Sea hares are widely distributed throughout most seas, and generally inhabit muddy or sandy tracts. The eggs are deposited in long strings. The food consists chiefly of sea weeds, but they also devour small crustaceans, molluscs, and annelids. The mouth possesses thick muscular lips, and the stomach is of compound nature, consisting of a crop, muscular gizzard and accessory cavities. The Sea hares acquired an unenviable notoriety among the ancients for their supposed venomous properties, and these molluscs formed ingredients in the poisonous compounds used of old to destroy enemies. Locusta is thus said to have used potions containing these Molluscs against the enemies of Nero, and they also formed ingredients in the draught prepared for the tyrant himself. Domitian was similarly suspected of administering the poisonous Aplysiada to his brother Titus. And when Apuleius was accused of practising magic a chief proof against him was held to be the fact that he had employed fishermen to obtain Sea hares for him. These animals, however harmless they may be so far as poisonous properties are concerned, exhibit the peculiar property of emitting a fluid of a rich purple hue, which, like the ink of the Cuttle-fishes, has the property of diffusing itself quickly throughout the surrounding water. Mr Gosse mentions that a West Indian species of *Aplysia*, on being put into a basin of clear sea water, emitted sufficient of this purple secretion to tinge deeply the whole of the water within a few minutes. And the common species found on the British coasts (*Aplysia hybrida*) exhibits a simi-

lar phenomenon. Goodair believed that the fluid was given out from the edge and internal surface of the mantle. These Molluscs are also known to discharge from an orifice behind the oviduct an acrid fluid of milky appearance, and which, when brought in contact with the human skin, is proved to be of irritant nature. Darwin mentions a species from St. Iago, the secretion of which caused a sharp stinging sensation on being touched. The *Lernæa* (*Aplysia leporina*) of the Bay of Naples has an evil reputation among fishermen for causing pain and sickness when touched. Probably the Sea-hares of the warmer seas possess irritant properties, which are certainly absent in their intensity in British species. Other species are the *A. inca* and *A. depilans*. The common British species (*A. hybrida*) attains an average length of about 3 inches. It is coloured of a dark green or olive hue, and is frequently marked with dark rings having white centres. The mantle also occasionally exhibits tints of purple or blue.

SEA HOG. See PORPOISE.

SEA HORSE. See HIPPOCAMPUS and LOPHOBRANCHII.

SEA KALE. See CRAMBE.

SEAL is used both for an engraved stamp bearing a device or inscription pertaining to the owner and for the impression of such a stamp on a plastic substance as wax. Seals are used for the purpose of identification, thus a seal upon a document was originally a substitute for a signature. A seal upon a place of deposit answered the purpose of security in a different manner from a lock. It did not actually prevent violence, but it conveyed an intimation of property, and contained a warning of detection and punishment to any one who should fail to respect it. The use of seals is of the highest antiquity, and their most common use has always been to give authority to documents by pledging the owner of the seal to the contents of the documents. Thus seals have been used from the earliest time by persons in authority to vouch their commands to their inferiors, and have also been delegated by such persons to others on whom they wished to confer special powers. One of the earliest and commonest forms of seal is the signet-ring. In the article RING we have given a sketch of the use of signets from the earliest times which will apply to the present subject. In Egypt impressions of seals were made in fine clay, and attached to documents by slips of papyrus. At a later period coloured wax or lead was employed. The seals were engraved with images of deities, names, emblems, and mottoes. Seals with the names of various Egyptian monarchs exist in the British Museum. Seals were also applied by the Egyptians to tombs, and sacrifices were distinguished by them. The Romans sealed bags of money, granaries, doors of female apartments. Under the empire the seals of seven witnesses were attached to a will, and by a law of Nero the will was pierced at a corner by a cord which was passed three times round it, and the seal was then applied. The Romans used clay, bees'-wax, and in the time of the empire lead for taking impressions. In the time of Constantine flat metal seals called *bullæ* were used. The metals used were gold, silver, and lead, and the *bullæ* were attached to documents by silk or woollen bands. The leaden seal was adopted by the popes, at first inscribed only with their monogram, but from the twelfth century with a more elaborate device, the size of the seal being at the same time enlarged. From this time they bore the name of the pope in full, with the heads of St Peter and St Paul, and the cross in the centre. At a later period the seal bore the arms of the pope. (See BULL and FISHERMAN'S RING.) The western monarchs gener-

ally used bullæ up till the sixteenth century. From the tenth century they were often made of gold until wax gradually superseded other materials. Philip II of France introduced the use of a small counter seal on the reverse, and the French monarchs continued to use a small one for the reverse side, while the great seals in Germany and England were made of the same size on both sides. The earliest mode of attaching seals appears to have been fixing them on the document. The practice of appending them to it began about the twelfth century. When a document received numerous signatures they were hung all round it. The earliest Anglo-Saxon seals were leaden bullæ fixed on the document. The use of bees' wax was introduced by the Normans. In the Norman period also the use of seals became common in legal formalities. White, or coloured wax was generally used, and from the beginning of the sixteenth century the wax was generally covered with white paper before receiving the impression. Sealing-wax was invented in the seventeenth century. Documents in England are still sealed in compliance with legal formality, but the true voucher to which alone any real importance attaches is the signature. There are three seals officially used in England by or in name of the sovereign—the great seal, the privy seal, and the signet. There is a similar set of seals for Scotland, which are only used for private rights and grants connected with that part of the kingdom.

SEAL (see the illustrations on the plate at CAR NIVORA), the name applied collectively to certain genera of Mammals belonging to the order Carnivora, and to the section Pinnipedia or Pinnigrada (see CAR NIVORA) of that order, in which section the feet exist in the form of swimming paddles. Two distinct groups of seals are defined by zoologists. These are the *Otariidae* or Eared Seals, and the *Phocidae* or Common Seals. The former are so named from the possession of a *pinna* or external ear, which, however, is of small and rudimentary nature, the ordinary seals being destitute of the slightest rudiment of an external ear. The *Otariidae* are further remarkable for their length of neck, and they are able to walk or stand upon all four limbs, the hind limbs being capable of supporting the body alone. These seals appear to be closely related to the Bears, a relation especially seen in the form of the skull, and in the large processes of the cranium—such as the supra orbital processes, and the crest developed on the internal surface of the parietal bones, this last being a special character of the Bears. These seals are almost exclusively found in the seas of the western hemisphere. The two best known forms included in the genus *Otaria* or Eared Seals are the Sea lion (*Otaria jubata*) and the Sea bear (*O. ursina*). The former extends as far north as Kamtschatka and the Kurile Isles. It attains an average length of about 15 feet and a weight of about 1500 or 1600 lbs. Its colour is a reddish brown in the male, which, with advancing age, becomes of paler hue. The neck and shoulders possess a 'mane' of stiff crisp hairs, the presence of which has gained for this form its popular name of 'Sea lion'. The females are destitute of this mane, and the fur of the latter may be of a light brown or chestnut hue. In midsummer these seals may be found on the North American coasts, and in autumn they assemble on the shores of Behring's Island in large numbers, for the purpose of attending to their young, which are born there. One male is always associated with three or four females, these forms being thus polygamous. The food consists chiefly of fishes, but the smaller species of seals are said also to form part of the dietary. The molars have sharp cutting edges, and the incisor teeth may be long and canine-like. Their cry is noisy.

These seals are hunted by the natives by means of arrows and harpoons, and they do not appear to be at all ferocious in disposition.

The Sea-bear or Fur Seal is found in the same regions as the former species, and was once very abundant at the Falkland Islands and other islands of the southern ocean, but the energy with which it is pursued for its valuable fur has caused its extermination in many of the localities in which it was in former years plentifully found. The average length of the Sea bear is about 8 feet. The limbs are well developed. The outer and longer hairs of its fur are of a grayish-brown colour, the thicker under fur being darker or reddish brown, and it is this fine under fur, which, when stripped of the coarse outer hairs and dressed by the furrier, affords one of the most beautiful and valued of the 'seal skins' of commerce. A 'mane' is present on the neck and shoulders, the hairs of which it is composed being of stiff character, and coloured black with white tips. These animals are also polygamous in habits, and the males are very fierce and jealous in guarding the domains of their respective families. One male is said to mate with from thirty to fifty females, but many of the animals existing at one time in a herd may be young females and males, which latter are soon driven off, and seek or take females to form herds of their own. The fur seal fishery is now chiefly carried on in Behring's Sea and near several islands there, but from the reckless way these animals are killed they threaten to become extinct. The rights of seal fishing here have formed matter for arbitration between Britain and the United States.

The *Phocidae*, or ordinary Seals, possess no outer ear, and the hind limbs are permanently stretched out behind the body and parallel with the tail, a conformation obviously inappropriate and unsuited for supporting the body for locomotion on land, but admirably adapted for swimming, as by means of a tail fin. The supra orbital processes, so well developed in the Eared Seals, are wanting in the *Phocidae*, and the space between the orbits or eye cavities is very narrow. Five toes exist in each foot, and the middle digits of the hinder feet are much shorter than the outer ones. Incisor teeth exist in both jaws, and the canines are not of large relative size to the incisors, as seen in the walrus (which see). The body in the Seals is fish-like in its general contour. The fur generally consists of a dense thick under fur and of an outer coat of longer and coarser hairs. The entire fur is kept lubricated by the skin secretions, and is thus protected from the action of wet. The toes of both fore and hind feet are united by a web of skin, and so form effective swimming paddles. The fore limb is connected by skin and muscle beyond the elbow to the body, but through the flexible wrist the weight of the body comes to be supported on the palmar surface of the hand. The toes are provided with claw like nails. Although outer ears are wanting, the orifices of the ears, and those of the nostrils also, can be closed by muscular action when the animals are under water. The bones are of light spongy texture, and beneath the skin a thick layer of blubber or fat exists, which serves at once to lighten the body in swimming, and to preserve an equable temperature, as in the Whales. The tongue is rough, and, as in the Common Seal, is bifid or cleft at its tip. The gullet is wide and extensible, and the intestine is very long for carnivorous animals. The dental formula of the Common Seal exhibits six incisor teeth in the upper and four in the lower jaw, two canines in each jaw, molars and premolars together to the number of ten in each jaw—making a total of thirty-four teeth. The milk or front set of teeth are shed before birth.

The neck in the Phocidæ is much shorter in comparison with what obtains in the Eared Seals. The eyes are large and intelligent, and the sense of smell is also well developed. The sense of touch appears to reside chiefly in the 'whiskers' of the face. The brain of the Seals is of large size in proportion to the body, and these animals when domesticated exhibit a very high degree of intelligence, their docility and attachment to their masters being well known, and 'performing' seals being often exhibited. These animals are polygamous, and seldom produce more than two young at a birth, one being the common number, and the mother seals are known to be remarkably attached to their offspring. As regards their distribution, the Phocidæ occur in almost all seas except those of tropical regions. In the northern regions they are more especially plentiful. The Arctic species are all generically distinct from those of south polar seas. They are largely hunted for their fur and blubber, a valuable oil being obtained from the latter, and to the Greenlanders the Seals afford many structures and tissues used in domestic life. The flesh is eaten as food, the skin is used for clothing and for covering their canoes and huts, the tendons are split up into threads for sewing, and even the intestines are used to make a transparent medium serving in place of glass.

The common seal (*Phoca vitulina*, illustrated at fig 17 of the plate) is found widely throughout the northern regions, and also around the more northern coasts of Britain. It forms the only species common on British shores. Its average length is from 5 to 6 feet, its colour being a grayish brown or yellow, mottled with brownish black. The under parts are of lighter hue than the upper. These creatures are very destructive to most of the food fishes. They are caught chiefly by shooting them, or by taking them whilst they are basking on the land. When taken young this species is readily domesticated, and may evince as much intelligence as an ordinary dog. The Harp Seal, Greenland Seal, Saddleback, or Atak (*Phoca or Cillocephalus Granlandicus*), inhabits almost all parts of the Arctic Ocean, and straggling members of this species occasionally find their way into British waters. The males average 5 feet in length, and are coloured of a tawny gray, with the distinctive dark marking or band, somewhat of a saddle shape, which commences at the root of the neck, and curves downwards and backwards on each side, extending to the hinder feet. The rough resemblance of this mark to the outline of a harp has procured for it the name of Harp Seal. The female Harp Seal is said to measure less than the male, and her colour is said to be a dullish yellow or tawny white. This seal is of great importance to the Greenlanders, the average weight of a full grown specimen averaging 230 lbs., of which 100 lbs. are edible matter. This species is the one chiefly caught by those engaged in the sealing trade. The Great Seal (*Phoca barbata*) may measure 8 or 10 feet in length, and attains a size which in this respect places it next the walrus among the Carnivora of the Northern Seas. It occurs in Southern Greenland, at the head of Baffin's Bay, and in Lancaster and Eclipse Sounds. From 400 to 600 of this species are caught annually. The Ringed Seal (*P. hispida*) of the far north, the Siberian Seal (*P. siberica*) of the Balkal Sea, and the Caspian Seal (*P. caspica*) are other species of the same genus. The Gray Seal (*Halocherus gryphus* or *griseus*) attains a length of from 8 to 9 feet, and frequents more southern regions than the preceding species. It is found on the Scandinavian and Icelandic coasts, and is said to breed on the Swedish coasts in February, and to produce one young at a birth. It has been seen on

the coasts of the Shetland Islands. The general colour is a dark gray, without distinctive markings.

The members of the genus *Monachus*, represented by the Monk Seal (*M. albiventer*) of the Mediterranean, and by other species of the Southern Seas, are distinguished by the notched crowns of the molar teeth, which are usually provided with double roots. The Monk Seal attains a length of from 10 to 12 feet, and is one of the most easily tamed species. The genus *Cystophora*, including the large Bladder-nose, Hooded, or Crested Seal (*C. cristata*, fig 20 of the plate) of the Greenland seas, is distinguished by the nose of the males being provided with a curious bladder like appendage, capable of being inflated at will from the nostrils of the animal. The body is coloured dark chestnut or black on its upper parts, marked with round or oval patches of a darker hue than the body colour. The under fur is of a red or coppery colour. This seal is of a ferocious disposition, and attains an average length of from 10 to 12 feet. In Danish Greenland from 2000 to 3000 of these seals are annually captured. The large Sea Elephant, Elephant Seal, or Bottle nosed Seal (*Macrorhinus leoninus*) of the Antarctic Seas, is also included by some authorities in the genus *Cystophora*, although its separation to form a distinct genus is more in accordance with its true relationship and affinities to other forms. This seal attains a length of about 20 feet, the body being stout in proportion. The colour of the male is a slaty gray, deepening with age into a dark brown, the females being of darker colour, and variegated with lighter markings. The females are also much smaller than the males. The males alone possess the proboscis-like nose, which is capable of great distention, and which is not fully developed until the third year of life. During the breeding season the males engage in desperate combats, and these animals are said to migrate northwards in winter. The young are born in June. The Elephant seals also occur on the Patagonian coasts, and it is related that about 40,000 of these animals were killed on the South American coasts in the early part of the nineteenth century, this wholesale slaughter soon reducing their numbers and rendering them scarce as at the present day. The blubber furnishes an excellent oil.

Many other species of seals, less widely known, have been described, amongst these latter are the rare Sea leopards or Leopard seals (*Ogmorhinus leptonyx*), so named from their spotted colour of gray, relieved with lighter spots on the upper parts. These seals occur off the South Orkney Islands and the East Polynesian coast. We may further enumerate the Crab eating Seal (*Lobodon carcinophaga*), Weddell's Seal (*Leptonychotes Weddellii*), Ross's Seal (*Ommatophoca Rossii*), all Antarctic species. The Seals are first represented as fossils in the Miocene and Pliocene deposits of the Tertiary epoch, whilst they are more plentifully found in Post tertiary formations.

The seal fisheries are prosecuted chiefly by British, Danish, and American ships. The British vessels meet at the end of February in Bressay Sound, off Lerwick, and in the beginning of March sail for the north. The seals are usually found about the first week in April. The great bulk of the seals killed consist of young Harp Seals. The blubber of about 100 seals yields a tun of oil, and good oil sells for about £30 a tun. The skins sell at about 5s each. The chief seats of the harp seal fishery are Newfoundland, Nova Scotia, Labrador, and Jan Mayen, and fur seals are obtained on the Pribilof Islands, belonging to Alaska. The capture of seals on these islands is strictly regulated by an agreement between the United States government and a com-

mercial company which has the sole right of capture. Immense numbers of fur seals have been slaughtered in recent years by American and Canadian fishermen in the Behring Sea. This latter fishery led to an international dispute between the United States and Britain, which was decided against the former by a court of arbitration in 1893. The court found that the Behring Sea was an open and not a closed sea, and that the United States could not claim property in the seals.

SEAL, GREAT. See CHANCELLOR.

SEA-LEMON (*Doris*), a genus of Gasteropodous Mollusca, belonging to the section Nudibranchiata ('naked-gilled') of that class, and to the family Doridæ. In this section the animals are destitute of a shell, and the gills are external, and placed on the back or sides of the body. In *Doris* the body is of oblong shape, and the gills exist in the form of a circle of plumes in the middle of the back, at the posterior extremity of the body. The beautiful plume-like gills can be retracted at will within the body. Two retractile tentacles exist, and spicules exist on the skin. Like all Gasteropoda, the *Doris* moves by means of its broad ventral foot. The name Sea lemon has been applied to these Molluscs from their usually yellow colour and somewhat lemon like shape. The Doridæ are carnivorous in habits, feeding on zoophytes, crustacea, &c. The anal orifice is placed posteriorly in the median line of the back. The eggs are emitted embedded in broad gelatinous ribbon like masses, which may be found attached to the fronds of tangle. These 'spawn coils,' as they are named, contain immense numbers of eggs, and Mr Darwin, in a ribbon coil found at the Falkland Isles, estimated that upwards of 600,000 ova were contained. The Doridæ may be found at low-water mark under stones and in similar situations. *Doris tuberculata*, or the 'Sea lemon' *par excellence*, is about 3 inches in length, of a yellow colour, and having the mantle warty. *Doris Johnstoni* and *D. blumellata* are also well known species.

SEA-LION. See SEAL.

SEAL ISLANDS. See LOBOS.

SEALKOIE, or SIAIKOI, a town of the Panjab, in the province and 68 miles north by east of Lahore. It was a place of note in the sixteenth century. Paper and cotton are extensively manufactured. It is the scene of a famous annual fair, and a local trade centre of rising importance. Pop. (1891), 54,930.

SEA MAT, or HORNWRACK (*Plusia*), a genus of Mollusca (see MOLLUSCA) belonging to the class Polyzoa (which see). The Sea mats are frequently cast up on our shores, and present the appearance of pieces of pale brown sea weed. When, however, this plant like form is examined microscopically, the mass is seen to be made up of a large number of minute and separate cells, in each of which a little zooid or polypide was contained. The Sea mat, in short, is a compound organism, produced by a process of continuous gemmation or budding from a single primitive polypide, which latter was in turn developed from a true egg. Each little zooid of the Sea mat possesses a mouth surrounded by a crown or circle of retractile, ciliated tentacles, a stomach, and intestine. The circulation of fluids within the cell is carried on by the ciliated endocyst, or inner delicate cell wall. The outer cell wall or ectocyst is generally of chitinous or horny consistence. A single nervous ganglion situated in each cell forms the nervous system in these forms. *Plusia foliacea*, or the Broad Hornwrack, as it is also termed, is a familiar species, as also are *P. truncata*, *P. denticulata*, &c.

SEAMEN. The laws of Great Britain relating to seamen are consolidated in the Merchant Shipping Vol. XII.

Act, 1894 (57 and 58 Vict cap ix), amended by subsequent acts. The local marine boards (which see) by establishing shipping offices afford facilities for engaging seamen by keeping registers of their names and characters, superintend engagements and discharges, and facilitate the making of apprenticeships. Seamen are liable to impressment (See IMPRESSMENT). Masters and mates of merchant vessels require certificates. (See MASTER and MATE.)

Apprenticeships.—The indentures of apprentices are to be signed in presence of and attested by two justices, who are to ascertain that the boy is twelve years of age, willing to serve, and of sufficient health and strength. Indentures must be recorded, and are free of stamp duty. Apprentices and their indentures must be brought before a shipping master before each voyage of a foreign going vessel.

Engagements.—The board of trade is to license persons to procure seamen. Penalties are inflicted for acting without license, for employing unlicensed persons, or for receiving remuneration from seamen for shipping them. Agreements for foreign going ships are to be made before and attested by a shipping master. Running agreements are allowed in foreign going ships with short voyages. Agreements for home shipping must be made before a shipping master or a witness. Penalties are incurred by shipping seamen without a duly executed agreement. Changes in crew of foreign going ships must be reported before leaving to the shipping master. Seamen engaged in foreign ports are to be shipped in presence and with sanction of the consul. A copy of agreement without signatures is to be posted up in an accessible part of the ship. Alterations in agreement must be duly attested. Seamen discharged before commencement of voyage are to have one month's wages as compensation. Allotment notes for wages must be in form sanctioned by the board of trade. An account of wages must be given twenty-four hours before discharge. The shipping master may act as referee in cases of dispute submitted to him. Ship's papers must be produced by master in any question relating to wages. The master must sign a certificate of conduct, character, and qualifications in form sanctioned by board of trade on discharging a seaman. Falsification of certificate is punishable as a misdemeanour.

Wages.—A seaman cannot by agreement deprive himself of his legal right to sue for wages or salvage. He may forfeit his claim by want of due exertion in case of wreck. Wreck of vessel or being put on certificate of incompetency bars subsequent claim for wages. Refusal to work or imprisonment for offence are valid grounds for stoppage of wages. Wages are to be paid on discharge, or within two days after termination of agreement on a home voyage, or within three days of delivery of cargo or five days of termination of agreement, whichever shall happen first, on a foreign voyage. This rule does not apply in whaling voyages or other cases where the seaman is paid by a share of the profits. Seamen may sue for wages up to £50 before two justices or a sheriff, whose decision is final. Wages under £50 may be sued for in the supreme court in cases of bankruptcy, arrest of ship, and some others. Wages are not to be sued for abroad except in case of discharge or danger to life. A proportion of seamen's wages is liable for relief given to their families from poor rates. Masters must take charge of or sell by auction effects of deceased seamen, must enter same with wages in official log, and pay to consul or shipping master with full accounts. Officers of customs and consuls abroad take charge of the effects and wages of deceased seamen and remit to board of trade. Effects and wages of seamen dying in the

United Kingdom are to be handed to shipping master at the port of discharge or to the board of trade. The board of trade adjudicates on the wills of seamen and claims of creditors under regulations laid down in the statute.

Leaving seamen abroad without certificate of consul, shipping master, or two respectable British merchants is a misdemeanour. When seamen are discharged abroad in consequence of sale or disposal of ship certificate of discharge is to be given and the seamen sent home at expense of the owner. Distressed seamen abroad may be sent home at public expense, and British ships are bound to take one for every 50 tons' burden and provide them with proper sleeping berths. On complaint of three or more of the crew a survey of the water or provisions of a merchant ship may be made by the commander of a queen's ship, consul, custom house officer, or shipping master. Seamen may forfeit a week's wages for frivolous complaint. Seamen are to be allowed to go on shore to make complaint to a justice. Seamen's wages are not liable to arrest or assignment, and various regulations are made to save them from imposition. Seamen may be summarily punished by imprisonment and forfeiture of wages for desertion, refusal to join ship, absence without leave, disobedience, and other offences. Offences are to be entered in official log with reply of offender. Deserters may be apprehended without warrant. Penalties are incurred for giving false name of self or ship (£5), enticing to desert (£10), secreting one's self and going to sea without consent of owner or master (£20). Naval courts may be summoned by consuls or commanders of queen's ships in cases demanding inquiry. (See NAVAL COURTS.) Offences committed by seamen at foreign ports are within the jurisdiction of the admiralty. The shipping master at port where crew is discharged is to inquire into deaths occurring on board foreign going ships. A general register and record for seamen is established in London. Particulars of voyages, crews, effects, births, deaths, and marriages are to be furnished by masters of foreign ships on arrival at destination, by masters of home trade ships half yearly. Shipping masters and officers of customs are to make necessary returns to registrar. By 30 and 31 Vict. cap. cxxiv 72 cubic feet of space, properly lighted and ventilated, are to be set apart for each seaman. When a seaman deserts or refuses to join ship, if it is alleged by five of the crew, or by one fourth if their number do not exceed twenty, that the ship is not in fit condition to proceed to sea, or has not sufficient accommodation, this shall be investigated by the court, which may order a survey of the ship. If the complaint is disproved the survey shall be at the expense of the complainants, if proved of the owners.

The law of the United States relating to the engagement, payment, discharge, treatment, punishment, &c., of seamen is essentially the same as that of Great Britain, and for ports of entry and of ocean navigation shipping commissioners are appointed to facilitate and superintend the engagement and discharge of seamen, and to arbitrate in questions arising between the master or owner of a vessel.

SEA MOUSE (*Aphrodite*), a genus of Annelides or Worms belonging to the order Errantia and family Aphroditidae. The body is oval, and less worm like in shape than in other Errantia. The head, which is indistinctly marked, is provided with tentacles and two eyes. The back is covered with scales or *elytra*, which, by their expansion and contraction, provide for the admission and expulsion of water from the gills or branchiae, situated beneath the scales. The most notable feature, however, in connection with these animals consists in the beautiful

iridescent hues exhibited by the hairs, *setae*, or bristles, which, as in other Errantia, fringe the sides of the body. The *setae* of the Aphrodite, even preserved in spirits of wine, still give out these brilliant hues. The barbed spines, which in some species fringe the edges of the body, are provided with horny sheaths, for the purpose of being withdrawn when not required for use. The mouth in the Sea mice is provided with a proboscis. These animals inhabit deep water, and may be obtained by dredging, although they are frequently cast up on shores after storms. Various species are known.

SEA OTTER. See OTTER.

SEA PEN. See PENNATULA.

SEA PIKE (see ICHTHYOLOGY, Pl. II.), a name applied to the Gar fish (which see). This fish is also known by the name of 'sea needle', from its attenuated shape, and as the 'mackerel guide', from its generally appearing before the shoals of mackerel arrive to spawn.

SEARCH OF INCUMBRANCES is the name technically given in Scotch law to the investigation made by an intending mortgagee or purchaser of heritable property to ascertain the existence of any burdens that may affect the property. The Scotch system of records affords facilities for this investigation which do not exist in England, and the search of the records is usually made for a period of forty years. This, however, is far from affording a complete security. The defects in the records are of too complicated a nature to admit of popular definition, one of the principal of them depends on what is called in Scotch laws *litigiosity*. This particular defect has, however, been remedied by the Titles to Land Consolidation (Scotland) Act of 1868, and the records now disclose whether there is litigiosity or not.

SEARCH WARRANT, an authority issued to a legal officer to search a house or other place for property alleged to have been stolen and suspected to be secreted in the place specified in the warrant.

SEA SCORPION. See SCORPION FISH.

SEA-SERPENT, SEA SNAKES. The disputed question as to the existence of a marine serpentine form of large size, inhabiting the seas, has already been referred to in the article *KRAKEN*. Amongst other considerations which may briefly be referred to in connection with this now notorious subject, we may particularize the fact that, from the numerous substantiated accounts of animals of one kind or another, but differing from all described and known forms, having been seen, often close at hand, by the crews and passengers of ships, and by respectable observers on land, we are shut up to the choice either of believing that in every case the senses of the observers must have been mistaken—a most unlikely result, or that, on the other hand, some living form must have been seen in the majority of cases. On *a priori* and zoological grounds the existence of a largely developed marine snake is highly probable. Naturalists know of nothing contrary to or inconsistent with the belief that large marine snakes may occasionally be developed, simply as abnormal members of their respective groups, an occurrence well exemplified in the case of the now verified existence of gigantic cuttle-fishes. And hence, although the subject of the existence of sea serpents of large size may be deemed almost beneath the serious notice of *savants*, it is nevertheless a topic which the naturalist cannot afford to pass over in silence. Careful research, and the weighing of the evidence presented in the accounts of 'sea-serpent' phenomena, show that the subject demands, at least, investigation, instead of being relegated, as it too frequently is, to the domain of superstition and credulity.

Sea-snakes, that is, serpents of marine or aquatic habits, are well known to naturalists as forming several distinct groups of Ophidia. Thus the Water viper (*Cenchrus pectoratus*) of America exemplifies a form which occasionally takes to the water in pursuit of fishes. Certain Old World snakes, belonging to the division Suspecta of the Colubrine sub order, are also partly aquatic in habits. Whilst still more typical water-snakes are seen in the family Hydrophida, which, as a family, are distinguished by the narrow ventral shield, by the valvular nostrils, by the moderately sized fangs and poison-glands, and by the pupil of the eye being small and round. The members of the genus *Pelamis*, included in this group, have compressed tails, well adapted for swimming, and inhabit the Pacific Ocean. The Black backed *Pelamis*, or Nalla Whallagee Pam of the Indian fishermen (*P. bicolor*, see article REPTILIA, Plate II), is found chiefly at sea, and averages about 3 feet in length. The members of the genus *Hydrophis* also possess compressed swimming tails, and of this genus the Shooter Sun (*H. obscura*), found in the Indian Ocean, and the Chittul (*H. sublevis*), sometimes exceeding 5 feet in length, found in India and Ceylon, are good examples. The Chersydrus (*C. granulatus*) of Java is another aquatic form, inhabiting the mouths of rivers and the shallow waters of creeks.

SEA SHORE, in law, signifies the strip surrounding a coast between high and low water mark.

SEA-SICKNESS, the name given to the nausea and other disagreeable sensations produced on those unaccustomed to a seafaring life by the rolling motion of a vessel at sea. The exact causes and etiology of this complaint are as yet imperfectly understood. Some observers have referred the malady to causes entirely dependent upon the altered or affected functions of the nervous centres, others have insisted that the regurgitation of bile into the stomach is the chief exciting cause of the sickness, whilst others, again, allege that the irritation of the liver consequent on the unusual movements of the body constitutes the chief source of the evil, and that the increased secretion of bile is only secondary to this latter cause. Probably all three views contain common truths, each of which, regarding the disturbance of the brain and nervous centres as the chief cause, may help to explain the nature of this distressing complaint. Mayo, in his Outlines of Physiology, long ago pointed out the 'dependence of the ordinary power of maintaining our equilibrium upon the combination of the guiding sensations derived through the sight and touch.' When a landsman goes to sea the movements of the ship, and the shifting lines and surfaces, 'unsettle his visual stability,' similarly as the 'different inclinations of the plank he stands on' unsettle 'his muscular sense.' The consequent derangement of these faculties reacts upon the nervous centres, and through the latter upon the viscera, thus producing the nausea and vomiting. Impressions thus received through the sensorial centres, and being duly felt, induce vomiting, after a fashion perfectly explicable to the physiologist. And as Carpenter remarks 'The recollection of these sensations, conjoined with the emotional state which they originally excited, may itself become an efficient cause of the action, at least in individuals of peculiarly irritable stomachs, or of highly sensitive nervous systems, for this plays downwards upon the sensorial centres in such a manner as to excite in them the same condition as that which was originally produced through the medium of the sensory nerve when the object was actually present.' This latter view may explain the reason why certain individuals may exhibit all the phenomena of sea-sickness on going on board a vessel which is perfectly at rest.

The remedies which have been suggested for the cure or alleviation of the sickness may be included under the two heads of preventive and curative remedies. Preventive measures, so far as vessels themselves are concerned, have been recently tried on a large scale, though with but little success, yet experiments with such vessels as the *Bessemer* steam ship, with its swinging saloon—intended theoretically to preserve its equilibrium in whatever direction the vessel may roll—or the twin steam ship *Castalia*—intended to reduce the rocking motion to its minimum through the breadth of the vessel—would seem to show that nautical men and ship builders are becoming alive to the interests and comfort of travellers. The *Bessemer* plan, although practically imperfect as yet, bids fair in due time to be perfectly successful. Preventive measures, regarded from the patient's point of view, are practically limited to the regulation of the diet previously to undertaking the voyage. The diet for some days previously should be plentiful, but of light and nutritious character. The bowels should not be constipated above all things, and food should not be taken for at least five or six hours before going on board. A cup of strong coffee, swallowed just before embarking, will, however, prove beneficial as a slight stimulant. Once on board the ship, a position as near the centre of the vessel as practicable is to be preferred. The posture in lying should be that on the back, with the head and shoulders very slightly elevated. With reference to curative measures, during the attack of nausea and vomiting, brandy and ice—if the latter can be had—in small doses, may be given. A bandage applied moderately tight across the pit of the stomach may afford support and relief, whilst some feel benefit from sipping frequent draughts of lukewarm or even cold water. The presence of this latter or any other fluid in the stomach will tend at least to prevent the disagreeable sensations of retching, which are amongst the most violent of those experienced in sea sickness.

It has been recently proposed that patients who are very much affected by sea sickness should take a full dose of hydrate of chloral, either with or without bromide of potash in combination, for the purpose of inducing sleep. And by this means it was proposed that in short voyages, as during the crossing of the Channel, the patient might calmly sleep throughout the passage, and be thus a stranger to the former pangs of sea sickness. It is almost needless to remark that this latter treatment, of doubtful efficacy even in short voyages, and of no use at all in a long sea passage, should never be adopted save under medical supervision and advice.

SEA SLUG, a name applied generally to *Sealemons* (which see) and other Gastropodous Molluscs destitute of shells, and belonging to the section Nudibranchiata. Such are the Doridæ or Sealemons, the Tritoniadæ, Aolidæ, Elysidiæ, &c. The name has been derived from the resemblance presented by these marine Gastropoda to the familiar terrestrial slugs. See MOLLUSCA, GASTROPODA, &c.

SEA SNIPE (*Centriscus scolopax*, figured at ICHTHYOLOGY), a genus of Acanthopteron Teleostean fishes belonging to the family Centriscidæ, and also known as the Trumpet fish and Bellows fish. Its popular names are all derived from the prolongation of the snout to form a tube like projection. The body is much compressed, and one of the first dorsal spines is movable, long, and sharp pointed. The mouth opens at the extremity of the long tube. Two dorsal fins exist, and the ventrals are small, and abdominal in position. This fish inhabits the Mediterranean Sea, and is occasionally found in British waters. Its colour is a bright red on the back, which merges into lighter hues on the sides, and into white

on the abdomen. The sides of the head are of a silvery yellow colour. It lives in deep water, and the food consists of Crustacea and minute organisms.

The name Sea snipe is also given to the Dunlin (*Tringa cinclus*), one of the shore dwelling Sandpipers. See SANDPIPER.

SEASONS, the four grand divisions of the year. Spring is from the vernal equinox, when the sun enters Aries, to the summer solstice, summer is from the summer solstice to the autumnal equinox, autumn is from the autumnal equinox to the winter solstice, winter is from the winter solstice to the vernal equinox. The earth's axis is inclined to the plane of the ecliptic at $66\frac{1}{2}^\circ$, and as the earth moves round the sun in the course of a year, the northern hemisphere is turned to the sun in summer (most so at the summer solstice), at the equinoxes the line of light and shade on the earth passes through the poles, and at the winter solstice the northern hemisphere is turned from the sun. It is evident that the characters of the seasons are reversed to inhabitants of the southern hemisphere. See SINE, &c.

SEA SPIDER. See Pycnogonum.

SEA SQUIRTS, a name sometimes applied collectively to the whole class of Mollusca known as Tunicata, or more specially to the genus Ascidium (see ASCIDIUM) which constitutes the typical example of the included genera. The name 'Sea squirts' has been applied to these organisms from their habit of emitting jets of water from the orifices of the body when touched or irritated in any way. The Sea squirts are of great interest as striking instances of vertebrate animals which undergo a development of degeneration in the course of their life history. The young forms have a notochord, which in most genera is absent in the adults. See MOLLUSCA and TUNICATA.

SEA SURGEON, or **SURGEON FISH** (*Acanthurus* or *Acanthurus chirurgus*, figured at ICHTHYOLOGY), a fish belonging to the Teleostean section Acanthopteri and family Acanthuridae, and so named from the presence of a sharp spine on the side and near the extremity of the tail, bearing a resemblance to the lancet of a surgeon. This fish occurs on the Atlantic coasts of South America and Africa, and in the Caribbean seas. Its scales are small, and the tail spine is movable, and set in a longitudinal groove. The colour is brownish, and the body may be variously marked with dark stripes and patches. Its average length is from 12 or 13 to 19 inches.

SEATTLE, capital of King county, state of Washington, United States, on Seattle Bay, on the east side of Puget Sound, 28 miles north of Tacoma. Among the more noteworthy buildings and institutions are the county court house, the county almshouse and hospital, the public library, the state university, a Baptist university, a female college, &c. It is the largest city in the state and a rapidly growing place, with numerous industrial establishments, such as shipyards, foundries, machine shops, saw mills, breweries, &c., and has an active trade in coal and lumber. A considerable portion of the town was destroyed by fire in 1889. Pop. in 1880, 3533, in 1892, 58,893, in 1900, 80,671.

SEA UNICORN, a name for the narwhal.

SEA WEED. See FETTER.

SEA WOLF (*Anarrhichus lupus*), the common name for a fish of the Blunny family, also known as the 'Sea cat', of ferocious aspect, and found in the seas around Britain. The mouth is armed with sharp strong teeth of large size, the inner series forming blunt molars or grinding teeth, adapted for crushing the shells of the molluscs and crustaceans upon which these fishes feed. The ventral fins are absent in the Sea wolf. This fish may attain a length of 6 or 7 feet, and in more southern seas it is said

to grow to a still larger size. Its colour is brownish gray, spotted and striped with brown over the upper parts, whilst the belly is white. When captured in the nets of the fishermen it attacks its captors with great ferocity, biting the nets and frequently doing great damage. It is generally stunned by being knocked on the head before being pulled into the boat. The flesh is palatable, and is largely eaten in Ireland, whilst the skin is durable, and is manufactured into a kind of shagreen, used for making pouches and like articles.

SEBACEOUS GLANDS, the name applied to small structures of glandular nature and sacculated form which exist in the substance of the corium, or deep layer of the dermis or true skin. They are very generally distributed over the entire skin surface, but are most numerous in the face and scalp. Those of the nose are of large size, and may frequently become enlarged from the accumulated secretion of the glands, whilst the largest in the body are the sebaceous glands of the eyelids—the so called *Mebomian glands*. Around the orifices of the mouth and anus, nose, and external ear, these glands are found in numerous array, but they appear to be absent from the skin of the palms of the hands and soles of the feet. Each sebaceous gland consists essentially of a lobulated or sac like structure opening by a single efferent duct. The wall of the sac, as well as that of the duct, is lined by cells of cubical epithelium. These cells secrete the sebaceous matter which collects in the gland, the cells becoming transformed into the secretion and breaking down in the process. The separate sacculi, or little pouch like divisions which make up each gland, may vary in number from 2 or 5 to 20. As a general rule the ducts of the sebaceous glands open into the *hair follicles*, or sac like involutions of the skin which surround and inclose the roots of hairs. But in many cases the ducts open simply on the external surface of the skin. There are generally two sebaceous glands in connection with each hair. A curious little parasitic mite, harmless in its nature—the *Demodex folliculorum*—is frequently found inhabiting the sebaceous ducts of the nose, especially when their secretion is pent up. This little organism is not known to occur elsewhere.

The sebaceous glands are first developed in the sixth month of embryonic life, and appear in their earliest condition as sac like appendages to the hair follicles. The secreting cells, containing fat particles, appear in the centre of the developing gland, and these cells gradually enlarge, and, escaping by the root or attached portion of the sac, constitute the first secretion of the gland. The functions of the sebaceous secretion are chiefly those of keeping the skin moist and from being cracked by the influence of heat and of the air. Friction between skin surfaces is also diminished in the same manner by the sebaceous secretion. The secretion is present in greatest amount in those races which inhabit warm climates and are greatly exposed to the sun's heat.

SEBASTIAN, Don, King of Portugal, posthumous son of the Infant John and of Joanna, daughter of Charles V, was born in 1554, and ascended the throne in 1577, at the death of his grandfather, John III. During his minority the government was conducted by his uncle, Cardinal Henry, brother of Emanuel the Great. He showed a great love for knowledge, and was educated, unfortunately, in an injudicious way, by his guardian, Catharine of Austria, wife of John III (sister of Charles V). Fanaticism took the place of piety in his mind, and Quixotism that of bravery. In order to distinguish himself from all other princes, he assumed the title of 'Most obedient king', as the King of France was

styled 'Most Christian king,' and the King of Spain 'Most Catholic king.' His devotion to the church was only equalled by his aversion to unbelievers. His constant dream was the conversion of Asia and Africa to Christianity, and the subjection of these continents to Portugal. His adventurous spirit appeared in an expedition which he made at the age of twenty years, with 800 or 900 Portuguese, to Ceuta, Tangier, and Magazar, the only possessions that remained to the Portuguese from former conquests in Africa. From these places he suddenly fell upon the unsuspecting inhabitants, and although no material results ensued, his lust for conquest and zeal for war against the infidels were ever after even livelier and stronger than they had hitherto been. An occasion for gratifying the latter passion soon offered. In the Kingdom of Fez and Morocco a war of succession had broken out. Mulei Moluk, the youngest son of the last emir, had, contrary to his father's will, been excluded from the throne, but after various turns of fortune had, with foreign aid, succeeded in conquering his hereditary kingdom, and compelling his nephew Mulei Mohammed, who had usurped it, to flee. The latter sought aid from Sebastian, who yielded to the request, hoping to effect something for Christianity and the fame of Portugal. In spite of the admonitions of all his relatives and counsellors, he equipped a fleet and an army, part of which he had collected in Spain, Germany, and Italy, and sailed for Africa, June 24, 1578. The expedition reached Tangier in safety, and then marched southwards into the interior, but at Alcazarquivir was met by the far more numerous host of Mulei Moluk. Here on the 4th of August, 1578, a decisive battle was fought, in which Sebastian was completely defeated. Almost all his followers, including the best of his nobility, were either slain or taken prisoners, and he himself was among the missing. On the morning after the battle a search was made on the field for the body of Sebastian. A valet of the Portuguese king found a corpse, which he supposed to be that of his master, but it was so disfigured with wounds that it was impossible to identify it. The consequence was that his death remained doubtful, and after Portugal had come into the hands of Philip, four adventurers appeared successively, pretending to be Sebastian. The last of the four played the most conspicuous part. He appeared, twenty years after Sebastian's defeat, at Venice, where he described particularly the mode in which he concealed himself on the battle field among the dead and wounded, and declared that he remained in Barbary lest he should disturb the tranquillity of Portugal. After this he lived as a hermit in Sicily, and at length resolved to make himself known to the pope. He had been plundered by robbers, and by chance recognized by some Portuguese, and carried to Venice. This was his story. He was banished by the senate, returned, and was thrown into prison. In the examination which he underwent he appeared so innocent and simple that all Europe was moved with sympathy. The senate set him at liberty, but banished him from Venice. A Dominican friar, Joseph Taxera, in Paris, moved every court in Europe to take an interest in his case. In the meantime he was apprehended again in Florence, and sent to Naples, where he was treated as a galley slave, but persisted in his story. Finally, according to some reports, he was sent to Castile, where he died. Sebastian's enterprise destroyed the flower of the Portuguese nobility, and the treasury was exhausted in the equipment of his fleet. After the disappearance of the king there were no immediate heirs to the throne, which was occupied till January, 1580, by Cardinal Henry, the last descen-

dant in the male line of the royal house of Portugal. Three separate houses then claimed the succession—Parma, Braganza, Spain. The last, under Philip II, succeeded by its superior strength, and Portugal was united to Spain for a period of sixty years.

SEBASTIAN, SAN See SAN SEBASTIAN

SEBASTIAN, St., a saint of the Roman calendar, who according to the legend was born at Narbonne, and under Diocletian, towards the end of the third century, was a captain in the pretorian guard at Rome. His position at Rome gave him many opportunities of contributing to the spread of Christianity, to which he had been attached for a considerable time, and protecting its adherents, but he was finally arrested and carried before Diocletian. The emperor, finding promises and threats vain, ordered him to be shot, and he was left for dead, pierced through with a thousand arrows. A Christian woman named Irene, who came by night to inter his body, finding signs of life in him, took him home, and nursed him till he recovered. He then presented himself before Diocletian, and remonstrated with him on his cruelty, whereupon the emperor ordered him to be beaten to death with clubs, and his body to be thrown into the common sewer, whence it was taken by another Christian woman, called Lucina, who buried it at the feet of the apostles Peter and Paul. In the ninth century his relics were carried to Soissons, whence they were dispersed through France, Spain, Germany, and the Netherlands. A church was erected to this saint by Pope Damasus. St Sebastian is invoked against the plague. His day is the 20th of January. There are many pictures of this saint by the most eminent painters. He is generally represented tied to a tree, with arrows sticking in his body.

SEBASTOPOL See SEVASTOPOL

SEBENICO, a town in Austria, Dalmatia, on a creek of the Adriatic, a little below the mouth of the Kerka, 42 miles SE of Zara. Its most remarkable edifice is a fine old cathedral with a lofty dome, and a semi-cylindrical roof of curiously-jointed flagstones, resting on arches, which spring from light airy columns. It is the see of a Roman Catholic and a Greek bishop, and has a Dominican, a Franciscan, and a Benedictine monastery. An important fishery is carried on, and there is a considerable shipping trade. Pop., including the suburbs, in 1870, 20,023.

SECANT In trigonometry the secant is the reciprocal of the cosine, and, therefore, with the usual notation, it is the ratio of the hypotenuse to the base. In the higher geometry it signifies the straight line which cuts a curve in two or more points.

SECESSION CHURCH, a large body of Presbyterians, chiefly in Scotland, whose founders, in 1783, withdrew from the Established Church of that country on account of the toleration of certain alleged errors in doctrine, the evils of patronage, and general laxity in discipline. In 1747 this body divided on the question of the lawfulness of certain oaths, especially the burgess oath necessary to be sworn previous to holding office or becoming a freeman in some burghs. Those maintaining the lawfulness of this oath were called Burghers, and those denying it Anti-burghers. Each of these bodies again split up into two smaller bodies, but the two main divisions of Burghers and Anti-burghers reunited in 1820 under the designation of The United Associate Synod of the Secession Church, the chief ground of difference (the burgess oath) having been by that time removed. The separate existence of the Secession Church terminated in 1847, when it became merged in the United Presbyterian Church, a body formed

by the union of the Secession with the Relief Church. For further particulars see UNITED PRESBYTERIAN CHURCH

SÉCHELLES See HÉRAULT DES SÉCHELLES

SECHUEN, or S/Æ CHUEN, the largest province of China, bounded north by Shense and Kansoo, east by Hoonan and Houpe, south by Koeichoo and Yunnan, and west by Tibet, area, 166,800 square miles. The surface is generally rugged and full of defiles, especially in the west, where many peaks rise far above the snowline, but there is a plain of some extent surrounding Ching too fo, the capital. The Yang tse kiang, the largest of the Chinese rivers, winds circuitously through the south east part of the province, and is augmented within it by some of its largest tributaries. The principal products are grain, silk, tea, rhubarb, sugar, oranges, citrons, tobacco, musk, skins, and a breed of horses remarkable for their small size and their swiftness. Pop., according to Daniel's estimate, 30,868,000

SECKENDORF, FRIEDRICH HEINRICH, COUNT or, an imperial field marshal, born in 1673 at Königsberg in Franconia, was brought up with his uncle, the celebrated historian and statesman, Vett Louis von Seckendorf. After studying law at Jena, Leipzig, and Leyden, he entered the army, and commenced his military career in the war against France, which was terminated in 1697 by the Peace of Ryswick. At the commencement of the Spanish war of Succession he was lieutenant colonel of the Anspach dragoons, and as the Anspach troops entered the Dutch service he proceeded with them to the Netherlands, where he took part in several sieges and battles. He greatly distinguished himself in 1704 at the battle of Hochstätt (Blenheim), and took part in the subsequent great battles of Ramillies, Oudenarde, and Malplaquet. He afterwards passed into the service of Augustus of Saxony and Poland, and was present as ambassador at the conclusion of the Peace of Utrecht. In the war against Sweden he contributed, at the head of the Saxon troops, to the fall of Stralsund in 1715. In 1717 he was raised to the rank of field marshal lieutenant, and in the same year commanded two Anspach regiments under Prince Eugene at Belgrade. He acquired new fame in Sicily, which the Spaniards had invaded, in prosecution of the ambitious schemes of Queen Elizabeth and her minister Alberoni. Their expulsion in 1720 was Seckendorf's work. In 1719 he had been made an imperial count by Charles VI. His next important service was in the field of diplomacy. In 1726 he was sent to Berlin as imperial plenipotentiary, and succeeded in gaining over King Frederick William I. to an acknowledgment of the pragmatic sanction, and an alliance with Austria. He was equally successful with other German and foreign powers, that had looked askance at the pragmatic sanction, and was thus mainly instrumental in freeing Austria from the dangers with which she had been surrounded. Next followed the Polish war of Succession. Seckendorf, after succeeding by his diplomacy in securing the active co-operation of Prussia, fought as a general of cavalry under Prince Eugene, took part in the taking of Philippsburg, and in 1735 gained the victory of Klausen, which was followed by a peace, in which Austria, however, lost both Naples and Sicily. A Turkish war now broke out, and on the death of Prince Eugene, in 1737, Seckendorf, as field marshal, became commander in chief. He was at first successful, but afterwards various untoward circumstances reduced his army to the greatest straits, and the whole campaign proved a failure. Seckendorf's enemies laid the whole blame upon him, and the emperor so far listened to them as to recall him,

and bring him before a court-martial at Vienna. In consequence of the decision he was committed to the fortress of Gratz. In 1740 he was set at liberty by Maria Theresa, and restored to his honours, but without receiving any active appointment. He thereupon abandoned the Austrian interest, and in 1742 entered the service of Charles II., elector of Bavaria, who had just been elected as Charles VII., emperor of Germany, and was then contending with Maria Theresa for the hereditary dominions of the house of Hapsburg. As general of the Bavarian forces he on two occasions, in 1742 and 1744, rid Bavaria of the Austrian troops, till, on the emperor's death in 1745, he himself set negotiations on foot for establishing a peace. Hereupon he was re-established by the new emperor Francis I., husband of Maria Theresa, in all the honours he had at an earlier period obtained in the imperial service, and retired to his castle at Meuselwitz. In 1758, during the Seven Years' war, he was suddenly arrested by Frederick II. of Prussia, on the charge of a treacherous correspondence with Austria, and carried to Magdeburg, where, for half a year, he was detained in confinement. He was then allowed to return to Meuselwitz, and died there in 1763.

SECONDARY FORMATION See GEOLOGY

SECOND SIGHT (in Gaelic, *taiseach*), a Highland superstition, which supposes certain persons endowed with the power of seeing future or distant events as if actually present. These visions were believed to be not as a rule voluntary, but were said to be rather dreaded than otherwise by those who were subject to them, yet it was also believed that those who possessed this gift might sometimes induce visions by the performance of certain awful rites. Various rules are given for the interpretation of the visions. Generally the visions were faithful representations of the events that were to happen at some future time, or had already happened at some distant place, but sometimes only a figurative interpretation could be given to them. The time at which an event was to happen was indicated by the time of day or night at which the vision took place. If the vision was by day its fulfilment was looked for within a very short interval, but if by night, it was considered to be more remote, and might not take place for months or years. The first published accounts of the beliefs of the Highlanders relating to second sight are included in the correspondence of the celebrated gossip Pepys, who, having made some inquiries on the subject, obtained from Lord Reay a letter previously written by Sir George Mackenzie (afterwards Earl of Cromarty) to Robert Boyle, in which the writer has set down the results of investigations made by himself in 1652, during a temporary residence in the Highlands. In 1703 further particulars were published in Martin's Description of the Western Highlands of Scotland, and in 1707 a Highland minister, the Rev. John Fraser of Tyree, gave to the world what he called authentic instances of the exercise of this gift. A Treatise on the Second Sight was published at Edinburgh in 1763 by Macleod of Hamir, under the pseudonym of Theophilus Insulanus. Great interest in the subject was shown by Dr Johnson during his tour in the Hebrides, and from Boswell's diary of that tour it would appear that the doctor was inclined to believe in the reality of the gift, although he was obliged to admit that none of the instances that had been brought under his notice was supported by sufficient evidence to satisfy him of its genuineness. One of the characters in Sir Walter Scott's Legend of Montrose is represented as possessed of second sight. The superstition is now almost extinct. In the Essay on the Fables of Popular Superstition, which forms the introduction to the Tale of Tamlane, in

Scott's Minstrelsy of the Scottish Borders, the author incidentally mentions one Maccoan, of Appin, who must have lived about the end of the eighteenth century, as the last person eminently gifted with the second sight.

SECRET, DISCIPLINE OF THE (*Arcani Disciplina*), the name given to the reserve practised with respect to the Christian mysteries by the early Christian church. This reserve consisted in keeping back from all but the faithful—that is, baptized Christians, and persons about to be admitted to baptism—the doctrine of baptism and the eucharist. Even the Lord's prayer and the symbol of the church, contrary to the original practice of the church, were not communicated to those about to embrace the Christian faith, after this secret discipline began to be observed, until they had been baptized or had partaken in the Lord's supper. The discipline appears to have originated in the second century. Tertullian, who flourished about the beginning of the third century, is the first Christian writer in whom we find an allusion to it, and he blames the heretics for not practising the same reserve with regard to the Christian mysteries as the orthodox Christians. The object of this secrecy was twofold—first, to guard the sacred Christian rites against the misinterpretation and contempt of the heathen, and, secondly, not to shock the catechumens, or those preparing for admission to the Christian church, by the revelation of doctrines which they were not yet ready to receive. The first object was not, however, altogether attained, for the heathen, knowing that the Christians observed in secret certain mysterious rites, suspected these rites to be of a flagitious nature, and the Christian apologists being prevented by this discipline from explaining to their accusers the true nature of these mysteries, were not able to disabuse their minds of the errors into which some of them had honestly fallen, or to refute the calumnies of those who wilfully slandered them. This practice, as one might have expected, continued to be observed for a considerable time after the reasons that had given rise to it had ceased to exist, and the Christian church had become predominant throughout the Roman Empire. It can be traced as late as the sixth century. Some Catholics, in their controversies with Protestants, have made use of this historical fact to establish the existence in the primitive church of a body of secret doctrine which has been preserved only in the traditions of the church. In this, they maintain, were included all those dogmas of the Catholic Church for which sufficient support cannot be found in the Scriptures, for example, that of transubstantiation. In 1685 there began a controversy between Schelstrate and Tentzel on this subject, in which Tentzel, replying to a work, *De Disciplina arcana*, published by the former at Rome in the year mentioned, endeavoured with much success to fix the limits of the mysteries of the early Christian church. See Rothe *De Arcani Disciplina* (Heidelberg, 1847).

SECRETARIES OF EMBASSY AND LEGATION, public officials attached to the suite of an ambassador and an envoy respectively. They are appointed by the sovereign, are usually ministers of the first or second rank, and rank along with *attachés*, next after *chargés d'affaires*. They have the same immunities in their own right as the head of the embassy himself, and are usually presented in person to the foreign sovereign at whose court they are accredited. Their duties are generally to assist their chief in the business of his office. British secretaries of embassy and legation prepare the reports transmitted to the foreign secretary on the manufactures, commerce, &c., of the countries in which they reside.

SECRETARY-AT-WAR, formerly the title of a high officer in the British ministry. The office ori-

ginated in the time of James I., and its duties were confined to the administration of the sums voted for the army, the secretary-at-war having no control over the commander in chief of the army or the master general of the ordnance. The inconvenience of this arrangement was so much felt at the time of the Russian war that in 1855 a secretary of state for war was appointed to be the supreme administrator in all matters connected with the army, and this new officer continued to hold the title of secretary-at-war in addition to his own title till 1863, when the former title was abolished.

SECRETARY BIRD (*Serpentarius secretarius*, see the figure at ORNITHOLOGY, Pl. IV.), a genus of Raptorial Birds, forming the type of a subfamily (*Serpentariinae*), related to the *Harpies* or *Circinae*. The name of this bird is derived from the peculiar plumes of feathers which project from each side of its head, and give it the appearance of having bundles of pens stuck behind each ear. The Arab name for this bird is 'Selazza Izn,' or 'Thirty Ears'. The genus *Serpentarius* is scientifically known by the bill being broad, and elevated at its base. The sides of the bill are compressed towards the tip. The wings are elongated, and carry a blunt spur on the shoulder, and the third, fourth, and fifth quills of the wing are longest. The tail is also very long. It is wedge-shaped, and its two middle feathers project beyond the others. The tarsi are elongated beyond those of Raptores in general, and are scaly in front. The three toes in front are short, and are united at their base. The hinder toe is shorter than the front digits, and is elevated above the latter. All the toes are covered with scales on their upper surfaces. The skin around the eyes is destitute of feathers.

The Secretary bird inhabits Southern Africa, and derives its generic name from its habits of devouring serpents—the deadly cobra falling a speedy prey to the attack of this bird, whilst many other Reptilia—lizards, tortoises, &c.—as well as insects, appear to be eaten by these birds. Le Vaillant mentions—and the items form certainly an astonishing collection both as to amount and variety—that in the stomach of a secretary bird he found eleven large lizards, the same number of small tortoises, a large number of entire insects, and three snakes, each as thick as a man's arm. This bird is accordingly of great value in destroying venomous snakes, and at the Cape of Good Hope a penalty is imposed upon any person who kills a serpent eater. It is easily tamed when taken young, and is often kept about farm yards, where it lives on familiar terms with the poultry, though it is said to occasionally eat a chicken. The classification of this bird has formed a matter of dispute among naturalists. Its proper place appears to be among the Raptorial Birds, but its length of limb induced some ornithologists to classify it with the Waders or Gallatores. The wings form effective organs by means of which the Secretary bird dashes the snakes to the ground and stuns them, while its strong feet are also used as weapons of attack. The mode of walking of this bird is ungraceful and ungainly when young, but when adult it is able to walk and to run with surprising swiftness. It can fly with ease when once it takes wing, but it seems to prefer the ground. Its average length is about 3 feet. Its colour is a slaty gray, the pen like feathers of the head being black, as also are the feathers of the upper part of the leg and the primaries of the wings. The tail is black, its central feathers being gray, with a white tip, and marked by a broad black band towards their extremities. The nest is generally constructed on the top of a high tree, and the eggs are two or three in number, and of a white colour.

SECRETARY OF STATE In England the term *secretary* was first applied to those clerks of the king who, being always near his person, were called 'clerks of the secret,' and the expression 'secretary of state' is said to have been first used in the reign of Henry VII. Even after this, and until the Restoration, the usual designation of this officer was 'king's chief' or 'principal secretary.' There was at first only one such officer, and two were appointed for the first time, it is said, under Henry VIII. Elizabeth first admitted them to the rank of privy-councillors, which all secretaries of state still hold in virtue of their office. The number of secretaries of state was increased to three for a short time after the union of England and Scotland, a separate secretary being appointed for the latter country. But this last office was soon abolished, and the number again reduced to two, at which it remained till it was once more temporarily increased to three in the reign of George III., when there was for a time a separate secretary of state for America. There are now five secretaries of state—one for the home department, one for foreign affairs, one for the colonies, one for war, and one for India. They have the custody of the signet and the direction of the signet office. They are all appointed by the sovereign, merely by the delivery of the seals of office, and are always members of the cabinet. The first three of these secretaries formerly had the charge of the paper office, the depository of all the public writings of state, negotiations, despatches, &c., but this is now under the control of the master of the rolls. The secretary of state for the home department has the supreme direction of all that relates to the internal government of the United Kingdom, the chief secretary for Ireland being under his authority. All patents, licenses, dispensations, charters, &c., pass through his office, and he is empowered to grant certificates of naturalization to foreigners. He claims the right of committing persons on suspicion of treason, but the legality of this claim has often been questioned. He recommends persons to the sovereign for civil knighthood. The secretary of state for foreign affairs communicates with and instructs British ministers abroad, communicates with foreign governments and their ministers in this country, negotiates treaties, either personally or through his subordinates. He recommends for appointment all ambassadors, ministers, and consuls who represent this country in foreign states, and grants passports to British subjects and naturalized foreigners. It is his duty to protect the interests of British subjects in foreign countries. The secretary of state for the colonial department is at the head of the colonial administration. He appoints colonial governors, and sanctions or disallows the measures of colonial governments. The secretary of state for war was first appointed in 1855 (See **SECRETARY-AT-WAR**). He recommends persons for the order of knighthood of the Bath. The office of secretary of state for India was created in 1858, when the government of India was transferred from the East India Company to the crown. India having a separate financial administration, this secretary has the power to act in matters requiring advances from the funds at the disposal of the crown without the concurrence of the lords of the treasury, and he is the only secretary of state who is entitled to do so.

SECRETARY OF THE NAVY, the title given by custom to the first secretary to the admiralty. He is a subordinate member of the ministry of the day, and is always a member of the House of Commons, in which he represents the admiralty when the first lord of the admiralty is a peer.

SECRETION, the name applied in physiological science to the processes whereby certain structures

—glands or membranes—elaborate, separate, or secrete, from the common medium presented by the blood, definite and specialized products destined either for use in the economy of the body, or for being sent out of the organism. In this way the process of secretion subserves a double function, or exhibits a double aspect, inasmuch as it not only manufactures products for home consumption, as it were, but provides also for the removal of waste matters from the body. When substances or products are elaborated for the use of the organism they are named *secretions*. When products are secreted only to be discharged from the organism they are distinguished by the name of *excretions*. To select a single example of each of these two aspects of this important vital action, we may take the liver and its bile as an example of a true secretion destined—primarily, at any rate—for use in the body, namely, in the process of digestion and elaboration of food. Whilst, as an illustration of the excretory form of the process, we may select the kidneys and their secretions as an example, these organs secreting from the blood urea, carbonic acid, and other products, which in the form of urine are destined to be discharged sooner or later from the body. The work of secretion is thus primarily seen to be among the most important of those actions the perfect performance of which contributes to the welfare of the organism, and interruption to the secretory processes results necessarily in the induction of disease of more or less serious kind. Both secretions and excretions, it may be remarked, are destined to be poured out from the secreting organ either upon the outer surface of the body or into some of its internal channels or ducts, and it would therefore appear in this view that the two processes are identical in their ultimate aims and ends.

But a primary distinction may also be drawn between true secretion and excretion, when we find that true *secretions* (for example, bile and milk) consist of substances or compounds which, *as such*, do not exist in the blood, but demand a process of elaboration in the glands or secreting structures for their due and perfect formation. Excretions, on the other hand—such as the urine—consist of substances which exist in the blood in a ready-formed state. Secretions, in fact, exist *potentially* in the blood, and require for their elaboration definite and special structures. Excretions, in this view, actually exist in the blood, and demand for their elimination and separation processes more analogous to mere filtering, as it were, and of less complicated kind than those demanded by the work of secretion. This latter distinction receives practical confirmation and support from the fact that when excretions are checked in their natural discharge they may appear in their characteristic form in the blood. This result is well seen in cases of suppression of urine, for example, through disease or injury of the kidneys. But if true secretions be checked they cannot, under the same or ordinary circumstances, be detected in the blood, and removal of the secreting organ for ever prevents the re-appearance of the secretion. It may happen, it is true, that a pent-up secretion may be re-absorbed by the blood, and be detected in that medium. But this latter circumstance obviously does not affect the grand distinction to be drawn between the actual nature of and differences between the two processes. The structure of excreting organs, it may be noted, is frequently of as complicated a nature as that of secreting structures, although, indeed, the process of elaborating a secretion might appear to demand greater complexity of parts than would be necessary in a merely excreting organ.

As mentioned in the article **MEMBRANE**, the essen

tial structural characters of a secreting surface consist, firstly, of a structureless *primary* or *basement membrane*, secondly, of *blood-vessels*, which bring the blood from which the secretion is elaborated, and lastly, of *cells*, or special structures devoted to the further elaboration of the constituents derived from the blood. A simple membrane, such as a *serous* or *mucous* membrane, exhibits the arrangement of these elementary parts in its simplest phase, whilst more complicated arrangements of the same essential parts result in the formation of the more definite secreting parts which we term *glands*. Of these latter structures, which, it need hardly be remarked, in them selves constitute most of the chief organs or viscera of the body, three great plans may be distinguished, so far as the arrangement of their elementary parts is concerned. Thus the *simple tubular glands*—well exemplified in the *tubular follicles* of mucous membranes, in the *gastric follicles* or *glands* of the stomach, in the *sweat* or *sudiparous* glands of the skin, &c.—consist of simple tubular involutions or depressions of the membrane which forms them, or with which they are connected. Each consists, therefore, of an open and elongated pouch or vesicle, the wall of which is composed of the primary membrane, whilst its lining is formed of secreting cells. This primary and elementary form of glands may be complicated by presenting a saccular rather than a merely tubular form, or by having the simple tube developed in a coiled form. The *aggregated* or *conglomerate glands* form the second division of gland structures. Such are the true *mucous glands* of the membranes of that name, the *salivary* and *mammary glands*, the *prostate gland*, and the *pancreas* or sweet bread. These glands exhibit an essential structure composed of rounded clusters of vesicles termed *acini*, grouped together in various ways, which contain gland cells, and which open by minute ducts gradually uniting to form the main duct of the gland. These acini or vesicles, as before, are lined by secreting cells. The third variety of glandular structures is that comprised in the idea of *convoluted tubular glands*. The structure of the kidney and of the testicle exemplifies this latter class of structures. In these glands we find tubules of basement membrane of generally uniform size, presenting a convoluted appearance and terminating either in blind pocket like extremities or by dilata-tions, as seen in the Malpighian corpuscles (See KIDNEY). Sometimes, however, such tubular structures may, as in the testicle, form a loop, and then return along their original course. The tubules are lined by their secreting cells, and in their tortuosity evince a structure which presents a large secreting surface frequently comprised within a very small space or extent. The tubuliferous glands always present us with one closed extremity, the other end opening on the free surface, and the blood is supplied to the secreting surfaces by means of a net work of capillary blood vessels which exist around the walls and between the interstices of the tubules.

The consideration of the more general relations and aspects of the function of secretion opens up several topics of great interest. Thus primarily the exact means or *rationale* whereby each gland is enabled, from the common medium furnished to all, to elaborate through its own special cells its characteristic secretion, presents us with a problem from the perfect solution of which physiological science is as yet very far off. That the minute cells, through their structure and inherent vital properties, perform this elaborate task is an obvious fact, since in all glands or secreting membranes cells are present, and in the cells themselves their particular secretion may be traced even before its discharge into the gland-ducts. Thus the cells of the liver contain bile, those of the mammary gland

contain the fatty particles of the milk, and those of the testicle spermatozooids. Yet these discoveries, great as they may appear, leave the subject of the intimate *rationale* of secretion as much an enigma to us as before. We can simply say cells secrete, but of the origin of these secreting powers and of the exact manner in which these powers are exercised we know nothing. Secreting cells develop and grow like other cells, and nourish themselves in a manner apparently similar to their neighbours. Whilst, in like manner to the other and constituent elements of the body, they appear to die or to become disintegrated, their place being supplied by freshly developed structures. Yet that some acute and distinct specialization of the powers of secreting or gland cells takes place over those of other and ordinary cells there can be no doubt whatever. And we are brought face to face with the limitation of one avenue of our knowledge when we try to form some idea of the why and wherefore of that specialization.

The view that secretion and the great process of *nutrition* itself—to which secretion, as we have already seen, ministers—are identical is a reasonable and thoroughly consistent opinion. Thus secreting glands—the liver, pancreas, kidneys, &c.—like all other structures of the body, renew their cell constituents, as we have seen, and the secretions and fluids of glands either contribute directly or indirectly to the maintenance of the organism, or insure its welfare by their discharge from its economy. Viewed as mere organs, and apart from all purely functional considerations, the structure and formation of secreting glands might be regarded as simply processes of pure nutrition. Thus certain glands will grow larger by an increase in their work of secretion, this circumstance proving that secretory work and nutrition are coincident and identical.

The various glands, their structure and secretions, being described each under its respective heading (LIVER, PANCREAS, KIDNEY, &c.), it only remains to point out a few of the more prominent circumstances which affect the work of secretion in general. The greater the vascularity or blood-supply sent or distributed to any secreting organ the greater are its secreting powers in the generality of cases. This, however, is a general rule applicable to glands as a whole, but not indicative of any special process or gland. The rate of circulation through a gland, or the mere quantity of the blood itself, cannot be shown to exert any direct influence on its secretory powers. Secretions may be retained for a lengthened period in some glands—such as the testicle—which are only periodically active, or they may be almost continually discharged, as is the case with the secretion of the kidneys. Under stimulation most if not all glands secrete more rapidly and abundantly, but the nature of the stimulation varies in different cases, or may be either of normal or abnormal kind. The discharge of secretions is effected by pressure from behind, whilst occasionally, as in the ureters and bile ducts, the presence of muscular fibres aids in the expulsion of secretions.

The chief general conditions which variously influence secretion are, firstly, as already remarked, the quantity and quality of blood traversing the gland. The particular quality of blood may affect secretion, as at certain times a greater quantity of a particular material may be contained in the blood, the presence of this material stimulating the action of some appropriate gland. If urea be thus present in the blood, either say from defective action of one kidney or as the result of great exercise, the healthy kidney will excrete more rapidly and more plentifully than if the urea had been absent. The influence of the

nervous system may be regarded as a second chief topic in connection with the general conditions of secretion. But much of this subject exists in a still obscure state. We know without doubt that by regulating the supply of blood to a gland the nervous system may indirectly operate in preventing or forwarding the work of any gland, and through the agency of conditions acting upon the *nervous centres* and upon the motor and sensory nerves, effects are respectively wrought upon the glands. Food in the mouth induces a reflex action (which see), which action, produced through impressions made on nerve centres and reflected to the nerves of the salivary glands, induces a copious flow of saliva through the stimulation of the glands. Mental conditions alone, and without material stimuli, will excite secretion, as seen in the flow of tears, or in the flow of saliva following the description of dainties, whilst the sudden stoppage of the milk secretion through fear or sorrow affords an illustration of the same fact. One secreting surface or gland bearing a functional relation to another gland (for example, kidneys and skin) may, through diminished or increased action, affect the latter.

SECRET WRITING See **CRYPTOGRAPHY**

SECRETE, a town in India, in the North-West Provinces, so close to Benares on the west that it may be considered as its suburb. It contains the civil establishment, the military cantonment, and the residences of the European population. Near their centre there is a church with a spire, and in the vicinity a neat chapel, in which the service is conducted in Hindustani. The other principal buildings are the courts of justice, the treasury, the jail, and the mint. The last, the only one of these buildings possessed of any architectural merit, was scarcely finished when the mint itself and the whole establishment connected with it was removed to Calcutta.

SECTOR, a part of a circle comprehended between two radii and the arc, or a mixed triangle, formed by two radii and the arc of a circle. Thus $\triangle ABC$, contained within the radii CA, CB , and the arc AB , is a sector of the circle of which the arc AB is a portion. The term denotes also a mathematical instrument so marked with lines of sines, tangents, secants, chords, &c., as to fit all radii and scales, and useful in making diagrams, laying down plans, &c. Its principal advantage consists in the facility with which it gives a graphical determination of proportional quantities. It becomes incorrect, comparatively, when the opening is great, or the result greater than the data. The sector is founded on the fourth proposition of the sixth book of Euclid, where it is proved that equiangular triangles have their homologous sides proportional. It consists of two rulers (generally of brass or ivory), representing the radii of a circular arc, and movable round a joint, the middle of which forms the centre of the circle. From this centre there are drawn on the faces of the rulers various scales, the choice of which, and the order of their arrangement, may be determined by a consideration of the uses for which the instrument is intended.

SECULAR CLERGY See **REGULAR CLERGY**

SECULARISM, a philosophy of life that one or two thinkers of the present day have begun to systematize, and that has found a considerable body of confessed adherents. The gist of it consists in the advocacy of free thought and the assertion of some corollaries derived from this leading tenet. In advocating free thought what the secularists mean is to express their conviction that the best means of arriving at the truth is to place perfect confidence in

the operations of human reason. It scarcely needs to be mentioned that they do not hold human reason to be infallible, but they maintain that it is in the interest of truth that reason should be corrected only by reason, and that no restraint whatever, penal, moral, or social, should be placed upon holding, expressing, or acting up to any opinion intelligently formed and sincerely held, however contrary that opinion may be to those generally current. They do not deny that opinions so formed may sometimes be erroneous and very pernicious in their consequences, but if the holder of such opinions has exercised care in arriving at them, and is sincere in his conviction of their truth, they acquit him of all moral blame in connection with them, and aver that the surest and quickest way of satisfying him and others of the falsity of these opinions is to resort solely to courteous argument in refuting them. So far from scepticism or the questioning of traditional beliefs being a reproach to a man, they regard it rather as a moral duty, believing that no man should believe anything till he is compelled by the laws of his own mind to believe it, and that to try the efficacy of that compulsion he should resist it as long as possible. Yet the secularist creed cannot be called a sceptical one, for the followers of this system do not believe that they should rest satisfied with doubting. When they find that certainty, that is, irresistible conviction, is unattainable on any subject, they consider that that subject should be left altogether out of account, that they should confess their ignorance with regard to it, and pass on to other subjects that may be investigated with more profitable results.

From the nature of their leading tenet it follows that the only moral principles they can hold are such as they believe must commend themselves to the reason and aspiration of every man of enlightened conscience. The foundation of such a set of moral principles they profess to find in the doctrine of Utilitarianism, not of course that utilitarianism that makes the end of life the gratification of pleasure in the vulgar acceptance of the term, nor even that which supposes individual happiness to be the end of life, but that which regards it as our highest duty to do all that tends to bring every individual to the highest perfection of which human nature is capable. The means to do this is, they think, most likely to be found in the study of man's whole nature, physical, moral, and intellectual, and of the laws of external nature, and these are the objects to which it directs our attention. By such researches, and by conduct based on their results, they hope to attain to 'that material condition in which it shall be impossible for man to be deprived or poor.'

Secularism does not come into direct collision with any religion, except perhaps in the assertion of the moral blamelessness of any opinion sincerely held, and of the duty of questioning traditional beliefs. It is not atheistic, inasmuch as it is no tenet of that system either to affirm or deny the existence of God. It does not deny the truth of Christianity, for that is none of its business any more than it is to affirm or deny some scientific theory. Yet Christians are not those to whom it specially addresses itself. They have a philosophy of life of their own, the exalted nature of which secularists do not seem generally inclined to question. Its object is rather to give intellectual repose to those who cannot conscientiously accept Christianity, and to furnish them and those unacquainted with Christianity with a reasoned basis for a worthy practical life.

The person who professes to be the founder of this system is George Jacob Holyoake (which see in SUPPLEMENT), a native of Birmingham, who began to promulgate his views about 1846. It is to him

that British legislation is chiefly indebted for the Evidence Amendment Act, which legalized affirmations or solemn declarations in cases in which previously an oath had been required

SECULARIZATION is the act of rendering secular the property of the clergy The first great secularization in Germany took place in 1648, on the occasion of the Peace of Westphalia The second took place after the Peace of Luneville in 1801 In England the first great secularization was made under Henry VIII The secularization of the monasteries and convents in Italy took place in virtue of a decree dated July 7, 1866, and extended to the former Papal States by another dated June 25, 1873

SECUNDERABAD, or **SIKANDRABAD** (*Alexander's Town*), a British military cantonment in Hindustan, in the native state of Haidarabad or the Nizam's Dominion, in a district covered with isolated hills of granite, 6 miles north east of Haidarabad It consists of the cantonment of the Haidarabad subsidiary force and is the largest military station in India, now covering an area of 19 square miles The principal buildings are an English church, infantry, artillery, and cavalry barracks The bazaars are well supplied The climate is very indifferent A peculiarity at this station is that the wet and cool seasons are the most unhealthy to Europeans Adjoning Secunderabad is Bolaram, the cantonment of the Nizam's contingent

SEDAN, a town of France, in the department of Ardennes near the Belgian frontier, on the right bank of the Meuse, united by bridges with Torgny on the left bank Its fortifications have been demolished and replaced by fine boulevards, avenues, and streets It is an attractive city, consisting of wide streets and substantial houses The chief edifices are the theatre, public library, and communal college The staple manufactures are woollens, which have long been famous The celebrated Marshal Turenne was born in a castle in the vicinity, and his bronze statue adorns a square which bears his name Sedan is now famous for the surrender of the French army and the Emperor Napoleon III to the Germans on the 2nd of Sept, 1870, after their defeat by the latter on the day previous This battle is commemorated by a monument, erected in 1896 (See **FRANCO GERMAN WAR**) Pop (1896), 16,472

SEDATIVES, medicines that moderate the excessive action of an organ or organic system Digitalis, for example, is a sedative of the action of the heart and the circulatory system, and gum resins sedatives that act on the nervous system Besides these, aconite, chloroform, conium and hydrocyanic acid are among the principal sedatives Carbonic acid is also sometimes locally applied as a sedative when the irritated state of the bladder or womb requires such treatment, or in cases of painful ulcer Prussic or hydrocyanic acid is a powerful sedative

SEDGE (*Carex*, natural order, Cyperaceae), an extensive genus of grass like plants, mostly inhabiting the northern and temperate parts of the globe The stems are usually triangular, without joints The flowers are monoecious or dioecious, and are disposed in one or several dense, scaly spikelets The seeds are triangular, and crustaceous or bony The roots are perennial and fibrous, the leaves hard and rough on the edge The sedges in general are of but little utility to man They furnish coarse fodder, containing little nutriment, especially after the flowering season is over, or when dried, and are rejected by most of the domestic quadrupeds The roots and leaves decompose with difficulty, and in the course of time contribute largely to turn the soil of marshes into peat The species are very numerous They are found in all soils, but most are marsh plants

Some are diaphoretic and demulcent, others are bitter and astringent The creeping underground stems of the sand sedge (*C. arcuata*) preserve the loose sand on the sea shore from drifting inland

SEDGWICK, ADAM, an eminent English geologist, born at Dent, in Yorkshire, on Mar 22, 1785, died at Trinity College, Cambridge, on the 27th of January, 1873 He graduated at Trinity College, Cambridge, in 1808, and was fifth wrangler of his year In 1810 he became a fellow of his college, in which he was eventually elected to the post of vicemaster In 1818 he was appointed Woodwardian professor of geology in his own university, and this chair he held till within a short time of his death In 1830 he was admitted a fellow of the Royal Society He was also a fellow of the Geological Society of London of which he was elected president for the years 1829-30 and 1830-31, and he assisted in founding the Cambridge Philosophical Society In 1833 he was president of the British Association He was appointed to a prebendal stall at Norwich in 1831 His chief services to geology consisted in the determination of the geological relations of the palaeozoic strata of Devon and Cornwall and of those strata afterwards called Permian in the north east and north west of England, in the explanation of the geological character of North Wales, and not less in the enlargement of the geological museum at Cambridge The only considerable work of Professor Sedgwick's is a Discourse on the Studies of the University of Cambridge, which had a wide circulation, but he is also the author of a multitude of papers of great value on geological subjects See the *Life and Letters* by Clark and Hughes (two vols, 1890)

SEDITION, the designation used in law for all offences against the crown and government which do not amount to treason and are not capital The offences classed under the head of sedition are of the same general character with those called treason, but they are not considered as amounting to the more serious of these two crimes unless the offenders are guilty of some overt act or can be charged with some actual design against the crown or government The punishment of sedition in Great Britain, formerly arbitrary, is now restricted to fine and imprisonment Under the old acts the court might sentence an offender to banishment on a second conviction, but this alternative was disallowed by 7 Will IV cap v It is a more serious offence than ordinary sedition to be a member of, or to correspond with, or aid in any way a seditious society, that is, any society of the kind prohibited by acts 39 Geo II cap lxxix, and 57 Geo III cap xix The former act denounces as an unlawful combination and conspiracy every political society of which any member is required to take an illegal oath or subscribe to an illegal test, or of which any of the proceedings are secret, or in which there are various divisions acting separately Religious and charitable societies and Fraternities' lodges are expressly excepted The punishment for being connected with such a society is a fine of £20 or imprisonment for three months when a person is convicted on information before one justice, and transportation (now penal servitude) for not more than seven years when the offender has been proceeded against by indictment The second of the two acts above cited brings under the same class all societies or clubs electing or employing any committee or delegate to communicate with a committee or delegate of any other society or club, or to induce any person to become a member of such societies or clubs Any person licensed to sell ale, beer, wine, or spirits, is liable to forfeit his license if he suffers any such society to meet in his house, and any person guilty

of that offence and not so licensed is liable for the first offence to a fine of £5, and for subsequent offences to the penalties imposed by 39 Geo III. cap lxxix. By 9 and 10 Vict cap xxxiii. it is enacted that all prosecutions under these statutes must be instituted in the name of the law officers of the crown.

In Scotland a distinction is made between sedition and *leasing making*, or verbal sedition, the latter being an offence against the sovereign's private character, whereas sedition is an offence tending to the disquiet of the state. Both offences are punished alike, namely, by fine and imprisonment.

SEDUCTION By English law an action for damages may be brought by a parent against the seducer of his daughter, and by a master against the seducer of his servant, or by any one under whose protection a female resides, the ground of the action being not the seduction in itself, but the loss of service caused by the pregnancy and inlying of the female. In this way it has been decided that damages may be obtained on account of the seduction of a married daughter living in her father's house apart from her husband. It is necessary that the female should be living in, or essentially forming part of the household of the person who brings the action, and it has been held that a father could claim damages on account of the seduction of his daughter though this took place when she was on a visit to a relative, as she was still part of his family. The damages, which are awarded by a jury, are always much greater than the mere loss of service would have caused, the amount varying according to circumstances. Damages may also be obtained by a husband on account of the seduction of his wife. By the law of Scotland such an action is competent to a husband against the seducer of his wife, and to an unmarried woman against her own seducer, but she must show that deceit was used towards her. In neither country is seduction a criminal offence.

The statutory rule which prevails widely in the United States rests both the right and remedy where the wrong is inflicted, in the family and parental relations. The action is therefore brought in the case of unmarried women by the parent (or guardian) as the head of the family, the offence is considered as one against the unity, happiness, and purity of the family. In the case of the seduction of a married woman the husband has an action against the seducer, in which full damages may be awarded for the domestic injury, and which is based on the simple fact that the union of the husband and wife has been virtually destroyed.

SEE, a word derived from the Latin *sedes*, a seat, and properly applied to the seat or throne of a bishop, but more usually employed as the designation of the city in which a bishop has his residence, and frequently as that of the jurisdiction of a bishop, that is, as the equivalent of diocese. See **DIOCESE**.

SEED The seed of a plant is the impregnated ovule. It assumes many forms in different plants, becoming rounded, oval, reniform, &c. It consists essentially of two parts, namely, the nucleus or kernel, and the integuments. The latter consist of two seed coats—the outer named the *episperm* or *testa*, the inner the *tegmen* or *endopleura*, and the two together are sometimes termed the *spermoderm*. The testa varies in colour and texture, generally it is of a brownish hue, and fleshy, succulent, membranous, or coraceous, its surface may be smooth, wrinkled, striated, ridged, netted, pitted, tuberculated, &c. The testa of some seeds is furnished with hairs, which cover the entire surface, as in various species of *Gossypium*, where they constitute the material called cotton, and also in the silk-cotton tree (*Bombax*), or they may be confined to certain points of

the surface, as in the willow, *Epilobium*, &c., while in the pine the testa forms wings, which must be carefully distinguished from the winged or samaroid fruits of the ash, elm, and maple, these wings being an expansion of the pericarp instead of the seed. In like manner hairy seeds must not be confounded with pappose fruits, such as those of the valerian, and of the dandelion and other composite plants, where the hairy expansions are conversions of the calyx. On the outside of the integument of the seed there is sometimes an additional partial covering, which has received the name of *aril*, and in the nutmeg forms the mace. The nucleus or kernel of the seed is the fully developed central portion of the ovule. It consists either of the embryo alone, as in the wall flower, or of the embryo along with a separate deposit of nourishing matter called albumen, as in the cocoa-nut and wheat. The embryo is the young plant contained in the seed, and is the part to the development of which all the reproductive organs contribute. It consists of a general axis, one part of which is destined to form the root, the other to form the stem. The axial portion is provided with fleshy organs called cotyledons or seed leaves, which serve to nurse the young plant before the appearance of the true leaves. The plumule or stem rises from the upper part of the axis, bearing the first ordinary leaves. Plants possessing one cotyledon are termed monocotyledonous, those having two are denominated dicotyledonous, and plants having only a cellular embryo, as in the cryptogamic or flowerless plants, are called acotyledonous. When seeds are contained in an ovary, as is usually the case, the plants are called *angiospermous*, when the seeds are not contained in a true ovary, with a style or stigma, the plants are called *gymnospermous*, as conifers. Besides the wonderful provision which nature has made for the dispersion of seeds, some being wafted through the air by the light downy appendages attached to them, and others being fitted, by their form and envelope, for being carried down rivers, their vitality or dormancy is also wonderful. Some seeds may be kept out of the ground for a century and still retain the power of germinating when committed to the soil. So also where seeds have been found deeply buried in the earth, or in soils not adapted for their germination, in positions in which they have lain quiescent for years, they have been known, on exposure to the air, or removal to a different soil, to exercise a vegetative power. See **ROTARY**.

SEED LAC See **LAC**.

SEELAND See **ZEALAND**.

SEGMENTAL ORGANS, the name given to the *sacs* or *sacculi* found in many Annelida or True Worms, such as Leeches, Errantia, &c., and formed by involutions of the integument of the body. In Hirudinea or Leeches these sacculi number seventeen on each side, as in the Common Leech (which see), and they secrete the mucus by which the body is lubricated. Some observers maintain that these sacculi are respiratory in function. In the Leeches these sacs are closed internally but open externally on the sides of the body by openings named *stigmata*. In the Oligochaeta or Earthworms the segmental organs are present in greater numbers than in Leeches, and they communicate internally in the Earthworms with the perivisceral or body cavity. They may be presumed in this case to be excretory in function. Some of the segmental organs in the latter are ciliated, and certain of them serve in some forms as efferent ducts for the generative organs. In Errantia, which order includes the free marine worms, these organs communicate with the interior of the body, and have much the same disposition and functions as in Earthworms.

SEGO, a considerable town in West Africa, in Bambarra, on the left bank of the Niger, now in French territory. The houses are built of clay, of a square form, with flat roofs, some of them have two stories, and many of them are whitewashed. Besides these buildings Moorish mosques are seen in every quarter. This town has been for many centuries a stronghold for the Mohammedan faith. Pop 30,000.

SEGORBE, a town in Spain, 29 miles N N W of Valencia, picturesquely situated among gardens, on a slope above the Palancia. It is surrounded by ancient walls, and has a cathedral and several other churches, an Episcopal palace, a spacious courthouse, a large and handsome hospital, and other buildings. Its principal manufactures are earthenware and paper. Segorbe was sacked by Suchet in 1812. Pop 7232.

SEGOVIA, a town in Spain, capital of the province of the same name, on a lofty rock, washed by the Eresma and Clamores, 43 miles north west of Madrid. It is surrounded by walls flanked with round towers, and defended by a turreted castle (formerly the royal treasury), but is very indifferently built, consisting of quaint old houses and very narrow winding streets. The principal buildings are the cathedral—one of the finest in Spain—several churches and suppressed convents, the Episcopal palace, mint (in which formerly all the national coinage was struck), a school for artillery cadets in the castle, arsenal, diocesan seminary, a theatre, several hospitals, a picture gallery, and a fine Roman aqueduct of granite, the most important remnant of Roman architecture in Spain. The woollen manufactures, once famous, are now all but extinct. Paper, linen, and glass are manufactured. Pop 10,339.—The province, area, 2713 square miles, consists partly of lofty mountains, partly of bleak plateaus, and partly of fertile plains. The chief mountain range is the Sierra de Guadarama, in which is the celebrated defile of Somosierra. The fertile districts bear wheat, barley, madder, flax, hemp, vines, olives, carob and chestnut trees, &c. Great numbers of sheep are reared. The mountainous parts contain silver, copper, lead, iron, marble, jasper. Pop (1897), 156,086.

SEGUIDILLA, a Spanish form of versification, consisting of four lines, generally assonant lines, of seven and five syllables alternately. It usually has a close of three verses, called *estribillo*, of which the first and last lines rhyme.

SÉGUR, an ancient French family, which has produced several distinguished men, including the following—

JOSEPH ALEXANDRE, born at Paris in 1752, died in 1805, was the author of several comedies and operas, which still remain popular, of the *Correspondance secrète entre Ninon de l'Enclos*, le Marquis de Villarsaux et Mad de Maintenon, a clever fabrication, a romance, *La femme jalouse*, and a work bearing the title of *Les Femmes*, leur condition, et leur influence dans l'ordre sociale. A selection of his works (*Euvres diverses*) appeared in 1819.

His brother, LOUIS PHILIPPE, COMTE DE SEGUR-D'AGUESSEAU, born in 1753, died in 1830, peer of France, and member of the French Academy. He was compelled by his father to adopt a military life, and served in America under Rochambeau, and after the peace of 1783 was ambassador to St Petersburg. In 1790 he was sent to Berlin, but after the deposition of the king he retired from public affairs, and in 1798 published his *Théâtre de l'Hermitage*—a collection of plays which he had composed for the private theatre of the Empress of Russia. In 1800 appeared his masterly *Histoire du Règne de Frédéric Guillaume II*, or *Décade historique*. From this time he occupied himself much with historical studies, the chief fruit of which was his *Histoire universelle* (Paris,

forty-four vols. 1817). In 1803 he was chosen a member of the Institute, and Napoleon appointed him one of the council of state. After the restoration he was received into the Chamber of Peers. In 1824 was begun an edition of his *Euvres complètes*, but it was never finished. The last volume that appeared was the thirty third, and was published in 1830. The first three volumes of this edition consist of his *Mémoires ou souvenirs et anecdotes*—a very interesting but an incomplete work.

PHILIPPE PAUL, COMTE DE SÉGUR, son of the preceding, born 1780, served in the army with distinction on various occasions, and executed several diplomatic missions. In the campaign of 1812 he was a general of brigade in the suite of the emperor, and performed the duties of a *maréchal du palais*. After the fall of the emperor he received from Louis XVIII the command of the cavalry troops that had been formed out of the old guard, but he again joined Napoleon after his escape from Elba. After the second restoration he withdrew into private life, and wrote his celebrated *Histoire de Napoléon et de la grande armée pendant l'année 1812*—a work more remarkable for narrative skill and philosophic breadth of view than for historical accuracy. He became a member of the French Academy in 1830, and in December, 1831, he was made peer for life, being one of the thirty created for the purpose of giving ministers a majority on the question of a hereditary peerage. He died at Paris in 1873. Besides the work mentioned by which he is chiefly known he was the author of various other historical as well as some fictitious works, and he left behind him an extensive collection of *Mémoires*, together with interesting notes on the first empire, the restoration, and the monarchy of July.

SEIDLITZ POWDERS, an aperient medicine, named after the Seidlitz spa in Bavaria, although the constituents of the waters of that spa are very different. They are made as follows—The alkaline powder which is contained in the blue paper consists of 2 drachms of Rochelle salts (tartrate of soda and potash) and 40 grains of bicarbonate of soda, and the acid powder in the white paper of 35 grains of tartaric acid. Before being used the alkaline powder is dissolved in half a tumbler of water, and the acid powder is then added, which produces effervescence, and the draught is taken while the effervescence is going on. Sometimes a little sulphate of magnesia is added to increase the strength.

SEIGNIORAGE, a royalty or prerogative of the crown whereby it claims an allowance for the gold or silver brought to the mint to be coined or to be exchanged for coin. Formerly the king had 5s for every pound of gold, but a certain proportion of this seigniorage was paid to the master of the mint for his work. Now no seigniorage is charged for coining gold in this country, although this practice is contrary to the opinion of political economists, for the result is that the standard coins of the country circulate at a rate below their real value as manufactured articles. If a seigniorage were charged equal to the cost of coining the coins would then circulate at their true value, a little above that of bullion.

SEINE (ancient, *Sequana*), a river in France, which rises in the department of Côte d'Or, at the south western extremity of the Plateau de Langres, on the northern slope of Mont Tasselot, in the Bois de Chanceaux, about 6 miles north west of St Seine and 20 miles north west of Dijon. The first part of its course is N N W through the departments of Côte d'Or and Aube, passing Chatillon and Troyes. After receiving the Aube it proceeds almost due west, passing Nogent, and entering the department of Seine-et-Marne where it receives first the Yonne at Montereau,

and shortly after the Loing, and the Loing Canal, all on the left. Here its course becomes again *N. W.*, and it proceeds through the departments of Seine et Marne, passing Melun, the south east of Seine et Oise, passing Corbeil, and Seine, in which last, shortly before entering Paris, it receives the Marne on the right. Traversing Paris it shortly after commences a long series of remarkable windings, receives the Oise on the right, traverses the north-west of Seine et Oise, passing Mantes, the department of Eure, passing Pont de l'Arche, and receiving the Eure, and that of Seine Inférieure, where it flows through Rouen, then resuming its series of windings across the southern part of that department it forms a long and wide embouchure, and finally joins the English Channel near Le Havre. Its direct course is 270 miles, its indirect course about 500 miles. Of the latter, 350 miles, commencing at Méry, below Troyes, in the department of Aube, are navigable, but only by barges, which require to be tracked against the current if not moved by steam. The navigation properly commences at Rouen, from which to the port of Havre the river is usually distinguished by the name of the *Seine Maritime*, and at full tide floats sailing vessels of from 400 to 500 and steamers of 600 to 800 tons. Its embouchure is much encumbered by shifting sandbanks. Works intended to remedy this evil were begun in 1847. At the time of the equinoctial gales and at spring tides a 'har' or great wave with a perpendicular front rushes up the river with a great noise as far as Jumièges, and sometimes even to Rouen. The area of the basin of the Seine is 16,700 square miles. No French river is better supplied with fish. In respect of the scenery, though in particular parts it is surpassed by the Loire, Saône, and Garonne, yet, taken as a whole, with the hills and valleys, forests and meadows, superb mansions, numerous villages, populous towns, and famous cities which line its banks, it is the finest river in France.

SEINE, a department in France, completely inclosed by the department of Seine et Oise, and at once the smallest and most populous of the French departments, including as it does the city of Paris. Its shape is nearly elliptical, greatest length, north to south, 18 miles, greatest breadth, 15 miles, area, 185 square miles. It has a flat but somewhat undulating surface, in which the highest point is Montmartre, 346 feet above sea level. The soil, naturally fertile, has received much artificial improvement. Only a few acres can be considered waste, and a great part of what surrounds the capital is laid out in orchards and gardens. Meadows to supply the food of cows for dairy produce are both extensive and luxuriant, in some districts a little wine and cider are made, regular agricultural farms are found chiefly in the remote communes. Of mineral products the building stone and gypsum obtained from the celebrated quarries of Montmartre are the most valuable. The manufactures are mostly confined to objects of necessity or luxury demanded by the capital. Besides the city of Paris it contains two arrondissements, St Denis and Sceaux. Pop in 1901, 3,599,870.

SEINE ET MARNE, a French department, bounded on the north by the departments of Oise and Aisne, east by Marne and Aube, south by Yonne and Loiret, and west by Seine et Oise, greatest length, north to south, 65 miles, average breadth, 40 miles, area, 2214 square miles, population in 1901, 355,638. The surface consists of extensive and gently undulating plains, covered generally with productive corn fields, and more partially with vineyards, which yield only an indifferent wine, and with forests of magnificent trees and valuable timber. Natural pastures are of limited extent, but very valuable artificial

meadows have been formed. There are no metals of any consequence, but there are excellent quarries of building stone, millstones, and gypsum, and beds of fine potters' clay. Melun is the capital, and the arrondissements are Melun, Coulommiers, Fontainebleau, Meaux, and Provins, subdivided into 29 cantons and 530 communes.

SEINE ET OISE, a French department, bounded on the north by department Oise, east by Seine-et-Marne, south by Loiret, south west by Eure-et-Loir, and north west by Eure, greatest length, north to south, 60 miles, mean breadth, 43 miles, area, 2163 square miles, pop in 1901, 700,405. The surface is finely diversified, though its numerous hills are only of moderate height. It belongs wholly to the basin of the Seine, which drains the far greater part of it either directly or by its tributary the Oise. The soil is fertile and well cultivated, and fruit is very abundant. Garden crops are raised on an extensive scale to supply the wants of the metropolis, and several districts are covered with forests of excellent timber. The only metal of consequence is iron, but there are valuable quarries of building stone, pavement, millstones, and gypsum, and extensive beds of porcelain and potters' clay. Versailles is the capital, and the arrondissements are Versailles, Mantes, Pontoise, Rambouillet, Etampes, and Corbeil, subdivided into 36 cantons and 686 communes.

SEINE INFÉRIEURE, a maritime department of France, bounded north and west by the English Channel, south by the estuary of the Seine and department Eure, and east by Oise and Somme, greatest length, east to west, 66 miles, mean breadth, 37 miles, area, 2330 square miles, pop in 1901, 843,928. The coast line presents no fewer than sixteen harbours, though Havre is the only one of consequence. It consists mostly of bold chalky cliffs of 150 to 750 feet high. The interior is more pastoral than agricultural, being very much broken by hills. In the south there are several considerable forests. The Seine, the only river of importance, drains the far larger part of the surface. About one half of the surface is arable, though not very fertile, and, in addition to cereals, a good deal of hemp and flax is grown. Cider is also extensively made from the produce of the orchards. There are no minerals of any consequence. The coast fisheries are productive. Rouen is the capital, and the arrondissements are Rouen, Dieppe, Havre, Neufchâtel, and Yvetot, subdivided into 51 cantons and 759 communes.

SEISTAN, a district in the east of Persia, formerly belonging to Afghanistan, but annexed to Persia about 1870. The district was visited by Sir F. J. Goldsmid and E. C. Ross in 1872, and is described by the former in a paper read before the Royal Geographical Society in January, 1873. He divides it into Seistan Proper and Outer Seistan, the former a tract lying about lat 31° N and lon 62° E, the latter the region to the north and east of that. The western and northern boundary of Seistan Proper is formed by an expanse called the Hamoon, which appears in maps as Lake Seistan, but which, according to Goldsmid, is for the most part dry, with only a few pools of water at the mouths of the principal feeders. Estimated pop of Seistan Proper, 45,000.

SEJANUS, AELIUS, the son of a Roman knight, and noted as the favourite of Tiberius, was born at Vulturn in Etruria. In 14 A.D. he was made commander of the prætorian bands, and he ultimately acquired the confidence of the suspicious Tiberius, to such an extent as to govern him completely, and the servile senate paid the greatest respect to the powerful favourite. The prætorian cohorts were also favourable to him, and there was no obstacle in the way of his attaining the supreme power he aimed at.

but Drusus, son of Tiberius, and the sons of Germanicus, the nearest of kin to the emperor Drusus was put out of the way by poison, the latter, with their mother, were banished and thrown into prison, a step which they did not long survive. Several distinguished Romans, friends of Germanicus, were beheaded at the instigation of Sejanus, and when Tiberius finally retired from Rome, and withdrew from the government, Sejanus governed with absolute power, and the senate ordered that the statues erected in his honour should be publicly worshipped. But at the moment of his highest elevation the suspicions of Tiberius were awakened, and his measures were taken so cautiously, that Sejanus suspected nothing until he was openly accused by the emperor before the senate (A.D. 31). He was then imprisoned, condemned to death, and executed on the same day.

SELACHII and **SELACHIA**, Müller's name for the order of fishes now known more generally as the *Elasmobranchii*, and which includes the Sharks, Rays, and their allies. The name *Selachii* is, however, in recent classifications used to indicate that group of the order *Elasmobranchii*, which specially includes the Sharks and Dog-fishes, these forms being known by the branchiæ or gills being placed on the sides of the neck, whilst the pectoral fins are of ordinary size, and are placed on the breast. The name *Selachia*, used to denote an order of fishes, corresponds to the more typical of Cuvier's *Chondropterygidae* or *Cartilaginous Fishes*. See also **ICHTHYOLOGY**, **PLAGIOSOMI**, **SHARKS**, &c.

SELBY, a market town of England, in the county of York (West Riding), 14 miles south by east of York, with which and with Leeds and Hull it is connected by railway, on the Ouse, here navigable for vessels of 200 tons, and crossed by an excellent wooden bridge, which opens to allow shipping to pass. It consists of four principal streets diverging from a central market place, adorned with an ancient Gothic cross, and several other streets, paved, and lighted with gas, and plentifully supplied with water. The houses are well but irregularly built. It has a magnificent parish church, in different styles of architecture, which once formed part of an abbey of Benedictine monks founded in 1068 by William the Conqueror, a new church, built in 1868, Roman Catholic and Nonconformist places of worship, a new town hall, museum with lecture room, two libraries, and several schools, ship building yards, and flax, shoe thread, oil, mustard and chicory mills, foundries, rope work, and very extensive malt kilns, and a trade in agricultural produce and the articles of manufacture. The tithe barn of the abbey, in which the monks stored their grain, still exists. Henry I was born at Selby. Pop. of urban district in 1891, 6022, in 1901, 7786.

SELDEN, JOHN, a distinguished English scholar and lawyer, was born December 15, 1584, at Salvington, near Worthing, in Sussex, and received his education at Oxford. After leaving Oxford he repaired to Clifford's Inn, London, being then about nineteen, and in 1604 he removed to the Inner Temple. On being called to the bar he acted principally as a chamber counsel. The first object of his studies was the history and antiquities of his native country, and in 1607 he drew up a work entitled *Analection Anglo-Britannicon*, a treatise on the civil government of Britain before the coming of the Normans. It was succeeded in 1610 by England's *Epinomes*, and *Jani Anglorum Facies altera*, a treatise on the progress of English law. In 1614 appeared his largest English work, *Titles of Honour*, still a standard authority in regard to all that concerns the degrees of nobility and gentry in England. This was fol-

lowed in 1617 by his *De Dilis Syriis Syntagmata Duo*, an inquiry into the Syrian idolatry. In 1618 he entered the field of politics by his *History of Tithes*, the object of which was to deny their divine right. This publication highly offended James I., and the author was brought before the High Commission Court, on which, without retracting his opinions, he declared his sorrow for publishing the work. In 1621 James I. in his speech to Parliament, having asserted that its privileges were grants from the crown, Selden spoke so freely in opposition to this doctrine, and was so instrumental in drawing up the protestation against it, that on parliament dissolving he was committed to custody. He was discharged at the expiration of six weeks on petition. In the following year he was elected member of Parliament for Lancaster, and was again a member in the two first Parliaments of Charles I., in the second of which he was appointed to support the impeachment of the Duke of Buckingham, and otherwise became a leading opposer of the arbitrary measures of the court. In 1629 he drew up his learned treatise entitled *Marmora Arundelliana* (See **ARUNDelian Marbles**). On the dissolution of the Parliament Selden was one of the eight members of the Commons who were imprisoned in the Tower on a charge of sedition, and who refused to give security for their good behaviour. This confinement lasted two or three years, but at length he was admitted to bail, and finally released in the beginning of 1634. During this period he wrote some of his treatises on Jewish antiquities, and in 1635 published his treatise entitled *Mare Clausum*, in answer to the *Mare Liberum* of Grotius in opposition to which he endeavours to establish the British right of dominion over the circumjacent seas. Some of the following years of his life were occupied in Hebrew studies, the result of which appeared in a work entitled *De Jure Naturali et Gentium, juxta Disciplinam Ebraeorum*, a valuable but not very well digested repertory of all the matter afforded by history or tradition in relation to the subject. In 1640, memorable for the meeting of the Long Parliament, Selden was unanimously elected member for the University of Oxford. His name appears on several committees appointed to inquire into abuses, but he neither concurred in the prosecution of Lord Strafford, nor seemed desirous to abrogate the Episcopal form of church government, although anxious to check the encroachments of ecclesiastical power. When the differences between king and Parliament were manifestly tending to open hostilities, he opposed the attempts of both parties to gain possession of the sword, and, when he failed, withdrew as much as he was able from public business. He remained, however, with the Parliament, and was a lay member of the Assembly of Divines which met at Westminster for the establishment of church government. In 1643 he was appointed by the House of Commons keeper of the records in the Tower, and the year following subscribed the Solemn League and Covenant. In 1645 he was elected one of the twelve commissioners of the admiralty, and in 1646 the Parliament voted him £5000 as a reward for services. He continued to sit in Parliament after the execution of the king, and employed all his influence for the protection of learning, and for moderating the fanatical zeal of his colleagues. He refused to gratify Cromwell by writing an answer to the *Eikon Basilikè*. He died November 30, 1654. In private life he was universally esteemed for his goodness of heart and urbanity of manners, and as a scholar he must be deemed one of the most learned men of his day. His style is often laboured and uncouth, although his speeches and conversation were peculiarly luminous and clear. Some opinion of the

latter may be collected from his Table Talk, published after his death by his amanuensis His library and museum were added to the Bodleian Library His whole works were collected in three folio vols. (usually bound in six) by David Wilkins (1726), with a life of the author See also Aikin's Life of Selden

SELECTION, NATURAL See NATURAL SELECTION

SELENITE, crystallized native sulphate of calcium See GYPSUM

SELENIUM In the year 1817 Berzelius discovered a new elementary body in the refuse of a sulphuric acid manufactory near Fahlun, in Sweden, to this substance he gave the name of selenium, from *sēlēnē*, the moon Selenium occurs in several minerals, chiefly in combination with copper, lead, mercury, and silver, native sulphur often contains selenium, and this element is found in the free state, crystallized in monoclinic forms, at Culebras, in Mexico Selenium is closely related, in its general chemical department, to sulphur and tellurium, these three elements forming a group which is characterized by certain well marked general properties, thus these elements combine with oxygen to form analogous oxides, they form oxy acids, to which strictly analogous formulæ are given, they combine with hydrogen in the same proportions, producing thereby bodies whose formulæ and properties are strictly comparable, and so on Several allotropic modifications of selenium are known, if the element be precipitated from a solution of selenhydric acid, by exposure to the air, it assumes the form of an amorphous powder, if this powder be melted and cooled quickly it acquires a vitreous appearance, it is hard and brittle, its colour is dark brown, and it has a metallic lustre Selenium is deposited from a solution in bisulphide of carbon, in the form of monoclinic crystals These various modifications of this element are possessed of different specific gravities, and of somewhat different specific heats

Selenium takes fire when heated to a tolerably high temperature in air or in oxygen, burning with a blue flame, and with the production of the dioxide SeO_2 The odour of burning selenium is most disagreeable, somewhat resembling that of decayed horse radish. The dioxide of selenium is a white

powder, which readily dissolves in water, the solution yielding, on evaporation, crystals of *selenous acid* (H_2SeO_3) This acid is analogous to sulphurous acid (see SULPHUR), it is bibasic, forming a well-defined series of selenites (M_2SeO_3) A more highly oxidized acid of selenium, namely *selenic acid* (H_2SeO_4), is also known, from which a large series of salts, the selenates (M_2SeO_4), is derived.

Selenium forms two chlorides, SeCl_2 and SeCl_4 , the former a liquid, the latter a crystalline solid With hydrogen selenium forms the very disagreeably smelling gas *selenuretted hydrogen* (H_2Se), the analogue of sulphuretted hydrogen. To selenium the symbol Se, and the atomic weight 79.1 are given

SELEUCIA, the name of several cities in Asia, founded by Seleucus Nicator One of the most celebrated was Seleucia-on the Tigris, made the capital of Babylonia in place of Babylon, from which it was distant about 30 miles, and which it eclipsed in wealth and splendour The Tigris and Euphrates flowed near its walls, and rendered it one of the richest commercial cities of ancient times The number of its inhabitants at the time of its greatest prosperity is estimated to have been about 600,000, chiefly Greeks During the decline of the Seleucid monarchy it became independent, and from its great wealth became the centre of attraction to the pillaging tribes of Southern Armenia and Media, by whom it was partially plundered several times In 116 A.D. it was burned by Trajan, and a few years later its destruction was completed by Lucius Verus, the Roman emperor From that time it was deserted, and became as desolate as Babylon itself—Another important city bearing this name was Seleucia Pieria, founded in 300 B.C., and situated on the sea coast at the foot of Mount Pieria, 12 miles west of Antioch Its natural strength was improved by every known art of fortification, and this combined with its magnificent buildings obtained for it a distinguished position among the great cities of antiquity It occupied a very prominent place in the wars between the Seleucids and the Ptolemies, but it rapidly declined under the Roman dominion, and in the sixth century of our era the city had fallen into complete decay Among the other cities of the name were a Seleucia in Syria, and one in Cilicia.

SUPPLEMENT.

RANGE FINDER See **GUNNERY**

RANGPUR, a district in the Rajshahi division of Bengal, area, 3486 square miles. This territory is flat and well watered, the chief product being rice. Some paper is manufactured at various places in the district. Pop (1891), 2,097,964.—**RANGPUR**, the capital, is situated on the Ghaghát river, 270 miles north-east of Calcutta. Pop (1891), 14,300.

RAPPOLTSWEILER See **RIBEAUVILLE**

RASGRAD, a town of Bulgaria, 34 miles south-east of Rustchuk. It was an important Turkish post during the Russo-Turkish war of 1877-78, but was captured by the Russians in the latter year. It has considerable trade. Pop (1900), 13,871.

RATA, the name of two valuable timber trees of New Zealand. The Northern Rata (*Metrosideros robusta*) sometimes attains a height of 100 feet. It has entire and rather thick leaves, and brilliant flowers in clusters at the tips of the branches. Its peculiar mode of growth makes it often appear like a climbing plant. The wood is dull red, straight in the grain, dense, and heavy. The Southern Rata (*Metrosideros lucida*), also called Ironwood, has sharp pointed leaves, and bright scarlet flowers in panicles.

RATANY (*Krameria triandra*), a shrubby plant found in Peru and Bolivia, having an excessively astringent root. It is sometimes used as an astringent medicine in checking bloody or mucous discharges, weakness of the digestive organs, and even in putrid fevers. It has silver gray foliage and pretty red star-like flowers.

RATNAGIRI, a maritime town of India, 140 miles south by east of Bombay, with a fort and lighthouse. It has an important sardine fishery. Pop (1891), 14,300.

RAUNDS, an urban district of England, in Northamptonshire, 9 miles S.E. of Kettering, with an Early English church of considerable interest and other places of worship. Boots and shoes are manufactured. Pop (1891), 3055, (1901), 3811.

RAWDON, a town of England, in Yorkshire (West Riding), 5 miles north-east of Bradford, with several places of worship, Baptist theological college, convalescent home, &c. Pop (1891), 3077, (1901), 3181.

RAWLINSON, **GEORGE**, clergyman and historian, brother of Sir Henry Rawlinson, was born at Chadlington, Oxford, on Nov. 23, 1812. Educated at Swansea and Ealing, he entered Trinity College, Oxford, in 1834, and graduated with a first in classics in 1838. He was elected a fellow of Exeter College in 1840, and became a tutor there. In 1859 he delivered the Bampton lectures, which were published in the following year under the title *The Historical Evidences of the Truth of the Scripture Records*. Previous to this he had published, in conjunction with his brother Sir Henry and Sir Gardner Wilkinson, his well known translation of

Herodotus (1858-60), a valuable work overburdened with imperfectly digested learning. In 1861 he was appointed Camden professor of ancient history at Oxford, and in 1872 he became canon of Canterbury. He was presented to the rectory of All Hallows, London, in 1888. One of his best known works is *The Five Great Monarchies of the Ancient Eastern World* (three vols., 1862-67), dealing with the history, geography, and antiquities of Chaldaea, Assyria, Babylonia, Media, and Persia, and supplemented by *The Sixth Great Oriental Monarchy* (1873), treating of Parthia, and *The Seventh Great Oriental Monarchy* (1876), dealing with the Sassanidæ or the New Persian Empire. His other historical works include *A Manual of Ancient History* (1869), *History of Ancient Egypt* (two vols., 1881), *History of Phœnicia* (1889), and *Parthia* (Story of the Nations, 1893). He also contributed to Smith's *Dictionary of the Bible* and to Thomson's *Aids to Faith* (a reply to *Essays and Reviews*), and the article Herodotus in the *Encyclopædia Britannica* (ninth edition) is from his pen. To *The Speaker's Commentary* he supplied the notes on many of the historical books of the Old Testament, and he also wrote for other Biblical commentaries and for *Men of the Bible*. In 1898 he published a biography of his brother Sir Henry Rawlinson (see next article).

RAWLINSON, **SIR HENRY CRESWICK**, diplomatist and orientalist, was born at Chadlington, Oxfordshire, on April 11, 1810. Educated in Somersetshire and at Ealing, he went to Bombay in 1827 as a military cadet in the service of the East India Company. He at once applied himself assiduously to the study of the Oriental languages, and was soon in request as an interpreter. After five years' service with the 1st Bombay Grenadiers, he was employed from 1833 till 1839 in military work in Persia. On the outbreak of the Afghan war of 1841-42 he was at Kandahar as political agent, and on its conclusion his distinguished services were rewarded with a companionship of the Bath. His stay in Persia had made him acquainted with the cuneiform inscriptions at Behistun, and on his appointment, in 1844, to the consulship at Bagdad he set himself to copy and decipher the chief inscription. The result was his great paper on *The Persian Cuneiform Inscription at Behistun*, printed in the *Journal of the Royal Asiatic Society* in 1846. Though not without important predecessors in the same field, and though Dr Hincks independently solved the problem at the same time, Rawlinson is justly regarded as the chief founder of the study of Persian cuneiform. Meanwhile he had shown great zeal and ability in the discharge of his political duties, and in 1851 he was raised to the rank of consul general. Resigning his post in 1855, he returned to England, and in 1856 he was created K.C.B., promoted lieutenant colonel, and appointed

a crown director of the East India Company. In 1858 he was elected a member of the House of Commons as a conservative, and he again sat there in 1865-68 as member for Frome. He was appointed to the new India council in 1858, and in 1859-60 he was minister plenipotentiary at Teheran. In 1889 he became a G C B, two years later he was created a baronet, and he died on March 5, 1895. Rawlinson received many honours both at home and from foreign countries. He was president of the Royal Asiatic Society in 1878-81 and of the Royal Geographical Society in 1871-72 and 1874-75. His chief published works are *Cuneiform Inscriptions of Western Asia* (six vols., 1861-80, 2nd edition of vol 1, 1891), with E. Norris, G. Smith, and T. G. Pinches, *England and Russia in the East* (1875), a strongly anti-Russian pamphlet, notes in his brother's *Herodotus*, and many papers in the journals of the Royal Asiatic and Royal Geographical Societies. See the *Life* by his brother (1898).

RAYLEIGH, JOHN WILLIAM STRUTT, BARON, physicist, eldest son of the second baron, was born on Nov 12, 1842, and succeeded to the title on the death of his father in 1873. He was educated at Trinity College, Cambridge, and graduated as senior wrangler and first Smith's prizeman in 1865, becoming a fellow of his college in the following year. From 1879 till 1884 he was professor of experimental physics at Cambridge, and since 1887 he has occupied the chair of natural philosophy in the Royal Institution. He was secretary to the Royal Society from 1887 till 1896, and since the latter year he has been scientific adviser to Trinity House. He is lord lieutenant of the county of Essex, and holds the honorary degrees of D C L, Oxford (1883), LL D, Montreal (1884), and LL D, Dublin (1885). In addition to many contributions to the proceedings of scientific societies, Lord Rayleigh has written the article *Optics* in the *Encyclopædia Britannica* (ninth edition) and a valuable work on *The Theory of Sound* (two vols., 1877-78, new edit., 1894-96). He was associated with Professor William Ramsay in his discovery of a new gas, called by them *argon*, in the nitrogen of the air.

RAZGRAD. See **RASGRAD** in SUPP.

RECEIVER, in England, a person appointed by the Court of Chancery to receive the rents and profits of land, or the produce of other property, which is in dispute in a cause in that court. The name is also given to a person appointed in suits concerning the estates of infants, or against executors, or between partners in some business for the purpose of winding up the concern.

RECKLINGHAUSEN, a town of Prussia, in the province of Westphalia, 15 miles north west of Dortmund, with a Catholic gymnasium, a Catholic and a Protestant higher girls' school, manufactures of damask, wicks, tobacco, bricks, &c., and coal mines in the vicinity. Pop. (1895), 20,644, (1900), 34,042.

RECLUS, JACQUES ÉLISÉE, French geographer and anarchist, was born at Sainte Foy la Grande, in Gironde, on Mar 15, 1830, the son of a Protestant minister. After being educated in the college of his native town and under Lutheran pastors in Germany, he travelled in Germany, England, Ireland, and America. In 1859 he began to contribute to the *Revue des Deux Mondes* articles on geography, geology, literature, politics, social economy, and other subjects, and he also became associated with several geographical journals. During the siege of Paris and the Commune he was a member of the National Guard. He was captured early in 1871 and condemned to deportation, but his sentence was soon commuted to exile, and he spent some years in Italy

and Switzerland. In 1892 he was appointed professor of comparative geography in the free university of Brussels. Reclus holds anarchist views similar to those of the distinguished Russian Kropotkin (which see in SUPP.). His greatest work is his *Nouvelle Géographie Universelle. La Terre et les Hommes* (nineteen vols., 1875-94), a splendid monument of the best geographical learning of our time. There is an English translation by E. G. Ravenstein and A. H. Keane (1887 onwards). His other works include *La Terre. Description des Phénomènes de la Vie du Globe* (two vols., 1867-68), translated into English as *The Earth* (1871), *Histoire d'un Russeau* (1869), *Nice, Cannes, Antibes, Monaco, Menton, San Remo* (1870), *Les Phénomènes Terrestres. Les Mers et les Météores* (1873), *Histoire d'une Montagne* (1880), translated as *The History of a Mountain* (1881), and *L'Évolution, La Révolution et L'Idéal Anarchique* (1898), treating of his social philosophy.

REDCAR, a town and watering place of England, in Yorkshire (N. Riding), on the coast, 7 miles north east of Middlesborough and about 4 north west of Saltburn. Formerly a mere fishing village, it is now an important sea side resort, with a number of places of worship, an esplanade and pier, race course, life boats, &c. There is a long range of fine firm sands here. Pop. (1891), 2818, (1901), with extended area, 7695.

RED CEDAR, a species of juniper (*Juniperus virginiana*) found in North America and the West Indies. The heartwood is of a bright red, smooth, and moderately soft, and is in much request for the outsides of black lead pencils. See **JUNIPER**.

RED CROSS SOCIETIES, societies founded for assisting the wounded in time of war, so named because their distinctive badge is a red cross on a white ground. Such societies have been established in all civilized countries as a result of an international conference held at Geneva in 1863, which was followed next year by an international convention agreed upon at the same place. According to this all hospitals and hospital officials, and all in any way engaged in attending the sick and wounded in war, are treated as neutral parties. There are several societies of the kind in Britain, as well as many others in other countries, there being an international committee at Geneva which serves as a centre of communication between the different bodies. In connection with this may be mentioned the decoration of the Royal Red Cross instituted by Queen Victoria in 1883, as a reward for ladies who have exerted themselves in aid of sick and wounded soldiers and sailors in time of war. The enamelled crimson and gold cross bears the words 'Faith, Hope, and Charity', with the effigy of her majesty, the royal and imperial cipher, &c., and is attached to a blue ribbon and worn on the left shoulder. It may be conferred on ladies of any nationality recommended by the secretary of state for war.

REDDISH, a town of England, in Lancashire, 4 miles south east of Manchester, with modern churches, almshouses, cotton spinning and calico-printing works, machine works, rope works, &c. Pop. (1891), 6854, (1901), 8668.

REDGRAVE, RICHARD, R. A., English painter, was born in London on April 30, 1804, and died in Kensington on Dec 14, 1888. He was for a time a clerk and draughtsman in the office of his father, who had a wire fence manufactory, and in 1826 he became a student of the Royal Academy. His first notable picture was *Gulliver at the Farmer's Table* (1836). It was followed by *The Trial of Griselda's Patience* (1838), and *Quentin Matsys* (1839), and in 1840, when he exhibited *The Reduced Gentleman's Daughter*, he was elected an Associate of the

Royal Academy Of his subsequent pictures we may mention *The Vicar of Wakefield* finding his *Lost Daughter* (1841), *Ophelia* (1842), *Cinderella* (1842), *The Fortune Hunter* (1843), *The Sempstress* (1844), *Fashion's Slaves* (1847), *The Moor hen's Haunt* (1847), *The Trout's Dark Haunt* (1848), *The Solitary Pool* (1849), *The Attiring of Griselda* (1850), *The Outcast* (1851), painted in the year when he became a Royal Academician, *The Flight into Egypt* (1851), *A Poet's Study* (1851), *Love and Labour* (1852), *The Forest Portal* (1853), *An Old English Homestead* (1854), *Sylvan Spring* (1855), *Cradle of the River* (1857), *Children in the Wood* (1860), *A Golden Harvest* (1861), *Sermons in Stones* (1874), *The Oak of the Mill Head* (1876), *Deserted* (1877), *Friday Street*, Wotton (1878), and *Hidden among the Hills* (1881). From being head-master of the Government School of Design he became inspector-general of art schools, and arranged the Museum of Art at South Kensington. He was joint author with his brother of *A Century of Painters* (1866). — His brother SAMUEL, born 1802, died 1876, is chiefly known for his *Dictionary of Artists of the British School*.

RED GUM TREE, one of the Australian *Eucalypti* (*Eucalyptus resinifera*), yielding a gum resin valued for medicinal uses. See **EUCALYPTUS**.

RED LEAD See **LEAD**.

REDONDA ISLAND, a small British island in the West Indies, one of the Leeward Isles, situated between Nevis and Montserrat. It is a dependency of Antigua, and with Barbuda, another dependency, it makes up an area of 62 square miles. The total population of the three islands was 31,971 in 1901.

RED RIVER, or **SONG KA**, a large river of Tonquin, formed by the junction of the *Lieton* and *Song shai*, the former rising in the Yun nan province of China, the latter in Laos. It flows s.e., passes Hanoi, and falls by several mouths into the Gulf of Tonquin. The navigation of the river is open as far as Lao kai, on the border of China and Tonquin, and the French have made several attempts to develop a trade with the Chinese along it.

RED SNOW See **PROTOCOCCUS** in **SUPP**.

REDWING, a town of the United States, capital of Goodhue county, Minnesota, on the Mississippi river at the head of Lake Pepin, 40 miles south east of St Paul. It is an important wheat shipping centre, and has several mills, factories, &c. Pop (1890), 6294.

RED WOOD, the name of various sorts of wood of a red colour, as an Indian dyewood, the produce of *Pterocarpus santalinus*, the wood of *Gordonia Hematoxylon*, the red wood of Jamaica, that of *Pterocarpus dalbergioides*, or Andaman wood, that of *Ceanothus colubrinus*, the red wood of the Bahamas, that of *Sequoia sempervirens*, a coniferous tree of California, the red wood of the timber trade, that of *Soymida febrifuga*, of which the bark is used in India for fevers, and has been employed successfully in Europe for typhus. The Californian red wood is the best known. The tree reaches a very great size, and forms forests in the coast mountains of California. It can stand the climate of Britain.

REED, SIR EDWARD JAMES, K C B, naval architect, was born at Sheerness on Sept 20, 1830, and educated at the School of Mathematics and Naval Construction in Portsmouth. He was at one time connected with Sheerness dockyard, and having become an authority on naval architecture he was appointed chief constructor to the navy, for which he designed a number of iron clads and other vessels. He resigned this post in 1870, but has held other government appointments. He was member of

parliament for the Pembroke boroughs in 1874-80, for Cardiff in 1880-95, and for Cardiff again since 1900. In 1886 he was a junior lord of the Treasury under Mr Gladstone. In 1878 he visited Japan on the invitation of the government of that country. He has published works on shipbuilding and coast defence, and Japan, its History, Traditions, and Religions (1880).

REEVES, JOHN SIMS (baptized JOHN), a distinguished tenor singer, son of a royal artillery bandman, was born at Woolwich on Sept 26, 1818. He studied music under his father, Cramer, and Calcott, and in 1832 became organist in the church of North Cray, Kent. After spending a brief period in the study of medicine in London, he made his first appearance as a singer in 1839 on the Newcastle stage. He first sang in London in 1842, and was for a time in Macready's company at Drury Lane Theatre, singing in Handel's *Acis and Galatea* and in other pieces. Having studied in Paris under Bordogni and in Milan under Mazzucato, he made his first appearance at the famed La Scala theatre of the latter city as Edgardo in Donizetti's opera *Lucia di Lammermoor*. Returning to England, he sang at a London concert in May, 1847, and later in that year he laid the foundation of his great reputation as a singer when he appeared at Drury Lane in the part of Edgardo. His voice was of wide compass and great beauty—mellow and powerful, capable of the tenderest pathos and of the most stirring martial appeal, but ever controlled by genuine artistic feeling and knowledge, the rare delicacy and finish of his phrasing being beyond the power of words to express. He was heard to most advantage in the concert hall and in oratorio and similar music, and in such pieces as *Guy Rammere* he displayed considerable histrionic ability. He died at Worthing, in Sussex, on Oct 25, 1900. He published his *Life and Recollections* in 1888, and *My Jubilee* in 1889. He was later in somewhat straitened circumstances, and in 1900 a civil list pension of £100 was granted him.

REFERENDUM is a term used in the Swiss Confederation to denote the reference to the citizen voters of resolutions or laws passed by their representatives. If these, when so referred, are accepted by the majority of the voters of the canton, then they become part of the law of the land, but if they are rejected, then the rejection is final. In the cantons of Uri, Glarus, the two Unterwaldens, and the two Appenzells there exists the most complete form of democracy, in which all the people meet together to discuss and vote on public questions. In Zurich, Berne, Schwyz, Zug, Solothurn, rural Basle, Schaffhausen, Grisons, Aargau, and Thurgau the compulsory referendum is in operation. In these cantons the people are summoned once or twice yearly to consider the principal acts passed by the representative chambers, and these acts they may approve or reject. Another form of referendum, the optional, is found in Lucerne, urban Basle, St Gall, Ticino, Vaud, Valais, Neuchâtel, and Geneva. In these cantons laws are submitted to popular vote only when a petition, duly signed by a certain number of persons, is presented within a prescribed period after the chambers have approved the law. In Fribourg, the only other canton, no referendum exists. The Federal Constitution is based on the optional referendum principle. Side by side with the referendum there exists in some of the cantons the right of popular initiative.

REGINA, capital of the territory Assiniboia, in the North West Provinces of Canada, a rising town on the Canadian Pacific Railway, well situated near the fertile wheat district of the Qu'appelle Valley.

It is about 360 miles by rail west of Winnipeg Pop in 1901, 2645

REGISTRAR-GENERAL, in Britain, an officer appointed by the crown, under the great seal, to whom the general superintendence of the whole system of registration of births, deaths, and marriages is intrusted

REICHSTAG (German *reich*, a kingdom, and *tag*, a day, a diet), the imperial parliament of Germany, which assembles at Berlin See **BUNDESRATH** in **SUPP**, **GERMANY**

REID, **MAYNE** (properly **THOMAS MAYNE REID**), writer of stories of adventure, was born at Bally roney, county Down, Ireland, on April 4, 1818, and died near Ross, Herefordshire, on Oct 22, 1883 Son of a Presbyterian minister, he was educated for the church, but his love of adventure took him to America, where he at different times engaged in various callings, and travelled extensively as hunter and trader In 1843 he settled for a time as a journalist in Philadelphia, but joined the U S army as a volunteer in 1846 and fought in the Mexican war, his experiences in which furnished him with materials utilized in several novels He afterwards came to London, and from 1850 he chiefly resided in England, where he became well known as a writer of thrilling stories, many of them based on his American experiences, such as *The Rifle Rangers*, *Scalp Hunters*, *The War Trail*, *The Headless Horse man*, &c He returned to the United States in 1867, but after a three years' stay he came back to England Many of his tales were translated into French and German They were all very readable and healthy in tone, if sometimes rather extravagant in incident

REIMS See **RHEIMS**

RELIGIOUS TRACT SOCIETY, a society founded in London in 1779 for the circulation of small religious books and tracts in foreign countries, as well as through the British dominions The circulation of the society's publications, which teach Evangelical Calvinism, is effected by means of depots, of grants to foreign societies and to missionaries, of colportage, &c, and is widely extended The business of the society is conducted by a committee chosen annually in London, and consists of lay and clerical members belonging both to the Establishment and Nonconformist bodies It disseminates publications in considerably more than 200 languages and dialects The *Leisure Hour* and the *Sunday at Home* are published by the Religious Tract Society, and also the *Boy's Own Paper* and the *Girl's Own Paper*

RÉMUSAT, **CHARLES FRANÇOIS MARIE**, **COMTE DE**, politician and man of letters, was born at Paris on Mar 13, 1797, and died on April 6, 1875 He was educated at the Lycee Napoléon, and entered life as a journalist and lawyer He was a member of the Chamber of Deputies from 1830 to 1848, was minister of the interior for a few months in 1840, and minister of foreign affairs in 1871-73, in both cases in the cabinet of M Thiers He began public life as a liberal, but ended it as a conservative During the second empire he lived in retirement, devoting himself chiefly to literary pursuits His works include several on English subjects, such as *L'Angleterre au XVIII Siècle* (1856), *Bacon* (1857), *Lord Herbert of Cherbury* (1874), *Histoire de la Philosophie en Angleterre depuis Bacon jusqu'à Locke* (1875), besides a volume on *Abelard* (1845)—His mother, **CLAIRE ELIZABETH DE VERGENNES**, **COMTESSE DE RÉMUSAT** (born 1780, died 1821), was a very remarkable woman Her essay on *Female Education*, published after her death, received an *academic couronne*, and her *Mémoires*, published in

1879-80, are particularly valuable for the light which they throw on the court of the first empire

RENAN, **ERNEST**, French historian, philosopher, and essayist, was born at Tréguier, Côtes du Nord (Brittany), on February, 27, 1823 His father (a master mariner, who was drowned at sea while his son was yet a child) was a Breton Celt, while his mother was a Gascon, and to this blended ancestry he owed his dual mental and moral characteristics The priests who directed the school in Tréguier trained him in Latin, and taught him the traditions of the Catholic Church till his sixteenth year Having proved himself a scholar of distinction, Renan was chosen in 1838 by the Abbé Dupanloup for a place in the Catholic seminary of St Nicolas du Chardonnet in Paris Here he remained until, in 1842, he went to Issy, near Paris, to receive a training in philosophy previous to his entering upon his studies for the priesthood At length, in 1843, he was admitted to the seminary of St Sulpice, and here he acquired a knowledge of Hebrew, Arabic, and Syriac The result of these studies in philology was to shake his belief in the traditional conception of Christianity, and as he found it impossible to enter the priesthood he quitted the seminary in 1845 While he now maintained himself by teaching in a school at Paris, he continued his historical and philological studies aided by the counsel and assistance of his sister Henriette In 1848 he received the Volney prize for an essay on the Semitic languages, amplified afterwards and published under the title of *Histoire Générale et Système Comparé des Langues Sémitiques* (1856) In the following year he was sent on a mission to Italy by the Académie des Inscriptions et Belles Lettres, and on his return he was appointed to a post in the manuscripts department of the Bibliothèque Nationale His *L'Avenir de la Science*, though not published till 1890, was written in 1848-49 He next published *Averroès et Averroïsme* (1852), and several *Etudes d'Histoire Religieuse* (1856) Having become known as an oriental scholar, he was appointed a member of a commission sent by the government in 1860 to examine the remains of Phœnician civilization in Syria It was during this journey in Palestine that he wrote his famous *Vie de Jésus* (1863), and he afterwards dedicated it to his sister Henriette, who, having accompanied him, had died at Byblos During his absence Renan had been appointed professor of Hebrew in the Collège de France, but when he delivered his opening lecture, in 1862, there was a hostile demonstration, and he was transferred to a post in the Imperial Library The publication of the *Life of Jesus* in 1863 gained for its author a European reputation, and was the first of a series on the *Histoire des Origines du Christianisme* which he made the chief work of his life This comprehensive work included the following further volumes *Les Apôtres* (1866), *Saint Paul* (1869), *L'Antéchrist* (1871), *Les Évangiles et la Seconde Génération Chrétienne* (1877), *L'Eglise Chrétienne* (1879), *Marc Aurèle et la Fin du Monde Antique* (1882), *Index Général* (1883) In addition to his studies as a scholar Renan took an interest in politics, and he became a candidate for the Corps Législatif as a liberal at the election of May, 1869 He made another attempt to enter political life in 1876, but he was again unsuccessful In 1879 he was elected a member of the French Academy During 1880 he delivered the Hibbert lectures in London on *The Influence of the Institutions, Thought, and Culture of Rome on Christianity*, and he also, at the same time, gave a lecture at the Royal Institution on *Marcus Aurelius* In 1884 he was appointed rector of the Collège de France, and

there he continued his labours until his death on the 2nd October, 1892. It is not yet possible to decide with any degree of certainty the ultimate effect of Renan's work on the religious thought of Europe, but to his own generation he was a man of unique personality, and a writer of great erudition, possessed of a brilliant literary style. Besides the works already enumerated the following should be mentioned: *De L'Origine du Langage* (1857), *Le Livre de Job* (1859), *Essais de Morale et de Critique* (1859), *Le Cantique de Cantiques* (1860), *Mission de Phénicie* (1865-74), *Questions Contemporaines* (1868), *La Reforme Intellectuelle et Morale* (1872), *Dialogues Philosophiques* (1876), *Mélanges d'Histoire et de Voyages* (1878), *Corpus Inscriptionum Semiticarum* (four vols., 1881-89), *L'Ecclesiaste* (1882), *Souvenirs d'Enfance et de Jeunesse* (1883), *Nouvelles Études d'Histoire Religieuse* (1884), *Discours et Conférences* (1887), *Histoire du Peuple d'Israel* (five vols., 1887-94), *Feuilles Détachées* (1892), and several dramas, such as *Caliban* (1878), *L'Eau de Jouvence* (1880), *Le Prêtre de Nemi* (1885), and *L'Abbesse de Jouarre* (1886). His *Lettres Intimes*, published in 1896, are a fitting memorial of his devoted attachment to his excellent sister Henriette. The best biography of Renan is that of Madame Darmesteter (1898).

RENI. See GUIDO RAVI.

RENOUF, SIR PETER LE PAGE, Egyptologist, was born in Guernsey on Aug. 23, 1822, and educated at Ely College, whence he passed to Pembroke College, Oxford, in 1841. He came under the influence of Newman and the Tractarians, and in 1842 entered the Roman Catholic Church. From 1855 to 1864 he was professor of ancient history in the Catholic University of Ireland. He began his career as an Egyptologist about 1860, and in 1863 he defended the work of Young and Champollion against Sir George C. Lewis. He opposed the dogma of papal infallibility, and in connection with this subject wrote on *The Condemnation of Pope Honorius* (1868) and *The Case of Pope Honorius reconsidered* (1869). From 1866 till 1885 he was an inspector of schools, and during 1885-91 he was keeper of the Egyptian and Assyrian antiquities in the British Museum. In 1875 he published *An Elementary Grammar of the Ancient Egyptian Language* (2nd edn., 1896), and in 1879 he delivered a course of Hibbert lectures on the *Origin and Growth of Religion as illustrated by the Religion of Ancient Egypt*. He was knighted in 1896, and died on Oct. 14, 1897. He left unfinished a translation of the *Book of the Dead*, with commentary, which was in course of publication in the *Proceedings of the Society of Biblical Archaeology* at the time of his death.

REQUENA, a town of Southern Spain, in the province of Valencia, about 40 miles west of that city. Its industries are connected with the culture of silk, saffron, grain, fruit, and wine. There are saline springs near it. Pop. 14,500.

RESECTION, in surgery, the operation of cutting out the diseased parts of a bone at a joint. It frequently obviates the necessity of amputating the whole limb, and, by the removal of the dead parts, leaves the patient a limb which, though shortened, is in the majority of cases better than an artificial one. Resection, which is one of the triumphs of modern surgery, became a recognized form of surgical operation in 1850.

RESET OF THEFT, in Scots law, the offence of receiving goods with the knowledge that they are stolen, and with the intention of concealing and withholding them from the owner. See RECEIVING STOLEN GOODS.

RESORCIN, a colourless crystalline compound prepared on the large scale by the action of sulphuric acid on benzene, and by the treatment of the resulting compound with caustic soda. It yields a fine purple red colouring matter and several other dyes used in dyeing and calico-printing.

REST HARROW, a common British leguminous plant (*Ononis arvensis*), akin to the brooms. It is plentiful in stiff clay land in some parts, and derives its name from its long and strong matted roots resting on the progress of the harrow. The stems are annual, often woody or shrubby, and hairy, the leaves are generally simple, entire towards the base, but the radical leaves are trifoliate, the flowers, mostly solitary, large, and handsome, are of a brilliant rose colour.

RESTIGOUCHE, a river of Canada, which in its lower course separates New Brunswick from the province of Quebec, flowing N.E. into the Bay of Chaleur at Dalhousie. It is 225 miles long, is navigable for 16 miles to Campbellton, and forms a tidal estuary for 24 miles. It drains 6000 square miles, and its basin supplies great quantities of timber.

RETHEL, ALFRED, German historical painter, was born at Aix la Chapelle on May 15, 1816, studied at the Academy of Düsseldorf (under Schadow), and afterwards at Frankfurt (under Veit and Schwind) and Rome. He died at Düsseldorf on Dec. 1, 1859. His greatest works are four frescoes in the town house of Aix la Chapelle representing incidents connected with the life of Charlemagne, other four there being executed from his designs after his death. These are among the finest modern works of the kind. German history and the Bible also furnished him with various subjects, and he painted in water colour a series of pictures illustrative of Hannibal's passage of the Alps.

RETRIEVER, a dog specially trained to fetch game which has been shot, and greatly valued by sportsmen for its sagacity in the field and in the water. The larger and more familiar breed of retrievers, the wavy coated, is formed by crossing the Newfoundland and the setter, the smaller or curly coated breed is formed by crossing the water-spaniel and the terrier. The typical retriever is 20 or more inches high, with a stoutly built body, strong limbs, webbed toes, and black and curly fur.

RETURNING OFFICER, the presiding officer who conducts an election and who returns the persons duly elected. In counties it is usually the sheriff, in boroughs the chief magistrate (mayor, &c.), or deputies acting for them.

RETZ, GILLES DE. See RAIS IN SUPP.

REUTER, FRITZ, German dialect poet and story writer, was born on Nov. 7, 1810, at Stavenhagen, in Mecklenburg Schwerin, where his father was Bürgermeister. After a preliminary education in the gymnasia of Friedland and Parchim, he studied law at the universities of Rostock and Jena. In 1833 he was condemned to death at Berlin for his share in a students' democratic society, but his sentence was commuted by the king to thirty years' imprisonment. Till 1838 he was a close prisoner in various Prussian fortresses, and after a further period of confinement in the Mecklenburg fortress of Domitz he was set free in 1840. For ten years he devoted himself to farming, but in 1850 he became a private teacher in the Pomeranian town of Treptow. In 1853 he became famous by the publication of humorous poems in the Platt Deutsch dialect, entitled *Lauschen un Rimels* (new series, 1858). These were followed by *Poltersabendgedichte* (1855) and *Reis' nah Bellegen* (1855), and in 1856 he went to Neubrandenburg. Seven years later he removed to Eisenach, where he died on June 12, 1874. His

later works comprise *Kein Hüsung* (1858), a tragical village story in verse, *Hanne Nute und de lütte Pudel* (1859), *Schurr Murr* (1861), a collection of tales in both Low and High German, and *Olle Kamellen* (seven vols, 1860-68), his chief prose work, a series of excellent tales in Platt Deutsch, including *Ut de Franzosentid* (1860), *Ut mine Festungstid* (1862), *Ut mine Stromtid* (his masterpiece, three vols, 1864), *Dorchlauchting* (1866), and *De Reis' nah Konstantinopel* (1868), *Die drei Langhause* (1878), a satirical play, *Lustspiele und Polterabend gedichte* (two vols, 1883), and *Reuter Rchiquien* (1885). An edition of his works in thirteen vols appeared in 1863-68, and in 1875 two volumes of *Nachgelassene Schriften*, with a biography, were added by Wilbrandt. See the *Briefe an seinen Vater* (ed Engel, 1896), and *Lives by Romer, Wilbrandt, and others*.

REVELGANJ, or **GODNA**, a commercial town of India, in Bengal, near the junction of the Ganges and Ghagra. It has an important local trade. Here Gautama, the founder of Buddhism, resided and taught. Pop (1891), 14,750.

REVERE, **PAUL**, was born at Boston, Massachusetts, on January 1, 1735, and learned the trades of goldsmith and copperplate engraver. He is famous for his ride through Charlestown to Concord on the night of April 18, 1775, to give warning of the British expedition, which was resisted next day at Lexington and Concord, a service immortalized in Longfellow's poem, *The Midnight Ride of Paul Revere*. This was, however, not an isolated service, for throughout the whole revolution he was of great service to his country in many ways. Subsequently he set up a foundry and erected works for rolling copper at Canton, Massachusetts, still carried on by his successors as the *Revere Copper Company*. He contributed liberally to many charitable institutions. He died in Boston on May 10, 1818.

REVIVAL OF LEARNING. See **RENAISSANCE**, also **HUMANISM** in **SUPP**.

REWA KANTHA, a political agency of India, subordinate to the government of Bombay. It was established in 1821-26, and has under its control 61 separate states, great and small, on the Nerbudda, most of which are tributary to the Guckwar of Baroda Area, 4980 square miles, pop (1891), 733,506.

RHEYDT, a town of Prussia, in the government of Dusseldorf, 16 miles to the west of Dusseldorf, important on account of its industries, which embrace silk and satin goods, cottons, and mixed fabrics, foundries and machine shops, printing and dyeing works, breweries, distilleries, &c. Pop (1890), 26,830, (1900), 34,034.

RHIO LINGGA ARCHIPELAGO, a group of reefs, islands, and shoals, belonging to the Dutch, and forming a southern extension of the Malay Peninsula. Close to Singapore are the two large islands Batam and Bintang, and farther south there are Lingga and Singkep. They are of an undulating and hilly character, and Lingga has a peak nearly 4000 feet high. The two chief settlements are the prosperous port of Rhio (which see), on the island of Bintang, and a finely situated town on Lingga. The chief exports are gambur, black pepper, gutta, rattans, and wax, much of these commodities going to the Singapore market. Rhio strait, to the west and south of Bintang island, is the regular passage for ships going eastwards towards the Sunda islands. Area of the group, 16,300 square miles, population, about 108,000.

RHIZOME, or **ROOT STOCK**, in botany, a sort of stem found in herbaceous perennials, running along the surface of the ground, or partially or wholly subterranean, sending forth shoots at its upper end

and decaying at the other. It occurs in the ferns, irises, &c., and in the ferns it may be wholly covered with the soil. In the mints, the sand-sedge, couch-grass, and other plants the rhizome is long and slender, but in Solomon's Seal, irises, birthroot, &c., it is stouter. Unlike roots, rhizomes bear scaly leaves at the nodes, and they also send down fibrous roots. The stouter rhizomes may act as storehouses of food.

RHODES, **CECIL JOHN**, South African capitalist and statesman, fourth son of the Rev Francis W Rhodes, vicar of Bishop Stortford, Hertfordshire, was born in his father's vicarage on July 5, 1853. He was threatened with consumption in 1871 as the result of a cold caught at a boat race, and was sent to South Africa in order to save his life. He began cotton planting with an elder brother in Natal. In 1872 he matriculated from Oriel College, Oxford, but the state of his health compelled him for several years to spend part of each year in South Africa, so that he did not graduate till 1881. In 1876 he entered himself as a student of law at the Inner Temple. He was not long in South Africa until he found his way to the Kimberley diamond fields, where he soon amassed a fortune, and where he effected his first important financial achievement, the amalgamation of the diamond mines under the De Beers company. In 1881 he was elected representative of Barkly West in the parliament of Cape Colony, and later in the same year he met General Gordon—'Chinese Gordon'—in Basutoland. Gordon was strongly attracted by him, and afterwards asked him to join him at Khartoum, but he preferred to accept the post of treasurer general which was offered him by the Cape Colony premier, Mr T Scanlen. He was instrumental in securing the proclamation of the British protectorate over Bechuanaland, of which he was deputy-commissioner in 1884-85. Not long after the discovery of the Witwatersrand goldfields he formed the company known as The Goldfields of South Africa, and subsequently he formed the more important British South Africa Company for the development of Rhodesia. The latter company secured a royal charter in 1889, and the great territory of Rhodesia was effectually attached to the British empire (see **RHODESIA** in **SUPP**). In 1890 he became premier of Cape Colony, with the support of the Afrikaner party, but he had to resign in 1896 owing to his part in the so-called Jameson raid at the end of 1895, when an abortive attempt was made by an armed party entering the Transvaal to coerce or overthrow the government of the country (see **TRANSVAAL**). He was summoned as a witness before the South Africa Committee appointed by the British House of Commons to inquire into the circumstances of the raid, and in the Committee's report he was severely censured for deceiving or ignoring those whom he was in duty bound to consult or obey, and for misusing his high position as premier. Despite this report Mr Chamberlain, the Colonial Secretary, who, as a member of the South Africa Committee, had signed it, declared in the House of Commons that there existed nothing against his personal character as a man of honour. In 1898 he was elected for two constituencies in the Cape parliament, and chose to sit for Barkly West. He took part in the defence of Kimberley against the Boer besiegers in 1899-1900, but his influence never recovered from the effects of the raid, and in the new state of matters that had arisen his death caused but little excitement and had no apparent effect on South African politics. He died at Cape Town on March 26, 1902, and was buried, in accordance with his own directions, in the Matoppos Hills in Rhodesia. He

was appointed a member of the Privy Council in 1895, and in 1899 Oxford University conferred upon him the honorary degree of D.C.L. He left a very large fortune, and his will was a most remarkable and characteristic document. He bequeathed £100,000 to Oriel College, Oxford, for certain specified purposes, and made large bequests for the benefit of Rhodesia. His Cape Town residence of Groote Schuur and its property he made over to Cape Colony to form the official residence of the future premiers of a federated South Africa, and he made provision for scholarships to be held at Oxford by students from the colonies, the United States, and Germany.

RHODESIA, a British possession in Africa, bounded on the north and north west by the Congo Free State, on the west by Portuguese territory and Bechuanaland, on the south by Bechuanaland and the Transvaal, on the east by Portuguese territory and the British Central Africa Protectorate, and on the north east by German East Africa. The river Zambesi, which traverses it from west to east, divides it into the two portions called Southern and Northern Rhodesia. The river Limpopo forms the southern boundary, and the Matoppos Hills and their north eastern continuations form the watershed between the basins of the Zambesi and the Limpopo. Of the tributaries flowing north to the Zambesi the most important are the Shangani, Umfui, and Pan yame, and of those flowing south to the Limpopo the Bubyie, Tuli, Shashi, and Macouteie may be mentioned. The whole country is a plateau varying in elevation from 3500 to 5000 feet above sea-level, and in Southern Rhodesia there are numerous mountain ranges, of which the chief is that of the Matoppos Hills already mentioned. Of the individual peaks Mount Hampden near Salisbury, Hartley Hill, Mount Wedra near New Umthali, and Mount Inyanga are the best known. There appear to be no lakes of any importance apart from the great lakes on the frontiers of Northern Rhodesia (Tanganyika, Moero, &c.). The prevailing rock formations are granite and metamorphic rocks, and rounded, projecting knobs of granite, often of fantastic appearance, form a striking feature in the scenery of many districts. The soil in many parts is fertile, and the ordinary cereals, vegetables, and fruit trees of Europe can be grown, in addition to the native crops of rice, tobacco, india rubber, and cotton. Extensive tracts of land are said to furnish excellent pasture. Gold has been worked in Southern Rhodesia from very early times, and there are striking remains at Zimbabwe (near Victoria) and else where of the works erected by the early miners. At the present time little, if any, alluvial gold is found, but quartz reefs are being worked with more or less success in various parts of the country, especially around Gwanda, Buluwayo, Gwelo, Sebakwe, Victoria, Umthali, Mazoe, Salisbury, Hartley Hill, Lo Magonda, Abercorn, and Selukwe. The total output of gold for the year 1900-1901 was 106,783 ozs., valued at £383,985. Coal, iron, copper, silver, tin, plumbago, and kieselguhr have also been reported, and some of them are being worked. The climate in the higher parts of the country is said to be generally suitable for Europeans, but in the lower swampy parts and some of the river valleys malaria is prevalent, and the tsetse fly commits great ravages amongst cattle and horses. The area above 3000 feet in Southern Rhodesia, most of which is adapted for the residence of Europeans, is stated at 100,000 square miles, and above 4000 feet, where European children can be reared, there are 26,000 square miles. The summer season, from December to April, is characterized by great heat

during the day and heavy rains, but during the rest of the year the weather is generally dry and much colder, especially in June and July. At Salisbury the mean July temperature is 57.5° F., the mean January temperature 70.5° F., and the extremes for the year are about 34° and 98°. The annual rainfall is about 33.8 inches, and falls on some 75 days. Southern Rhodesia is being rapidly opened up by means of railways, telegraphs, and roads. Buluwayo is in direct railway communication with Cape Town and in 1899 the line from Salisbury to the Portuguese coast at Beira was opened for traffic. A line to connect Salisbury with Buluwayo is rapidly approaching completion, and other subordinate lines have been projected or begun. The whole of Rhodesia, together with the treeless plain of Barotseland on the north west, acquired in 1899, is under the administration of the British South Africa Company, which was incorporated by royal charter in 1889. It is named in honour of Mr C. J. Rhodes, the founder of the company. Northern Rhodesia is divided into two parts under separate administrators, namely North Eastern Rhodesia (head quarters, Fort Jameson) and North Western Rhodesia (head quarters, Laluni). Southern Rhodesia consists of the two former districts of Mashonaland (capital, Salisbury) and Matabeleland (capital, Buluwayo), and is more directly under the control of the Imperial government. Its administration is carried on in accordance with the company's charter as amended by order in council of 1891 and 1898. The senior administrator, with head quarters at Salisbury, has an administrative council of six members and a legislative council of ten members, the latter including two elected representatives of each of the two great divisions of the province. The enactments of these councils are subject to the approval of the High Commissioner for South Africa, who acts through a Resident Commissioner. Jury trial was introduced in 1899. There are resident magistrates and judges, from whom an appeal lies to the Supreme Court of Cape Colony, and thence to the Judicial Committee of the Privy Council. Salisbury and Buluwayo have a regular municipal government, and doubtless this will be extended in time to the rising towns of Umthali, Gwelo, Tuli, Tati, Victoria, Wankie, Melsetter, Enkeldoorn, Charter, Gwanda, &c. The chief tribe of original native inhabitants is that of the Mashonas, a peaceful and industrious race. In 1836 a Zulu people, known as Matabele, invaded the country under a chief called Mosilikatse, and easily conquered the indigenous inhabitants. For more than fifty years this warlike race held undisputed sway in Southern Rhodesia, and appear to have grievously oppressed the subject people, but in 1890 an expeditionary force equipped by the British South Africa Company occupied Mashonaland without opposition and founded the town of Salisbury. The Matabeles were for a time left undisturbed, but in 1893 their raids into Mashonaland gave the company an opportunity of extending its authority. Three columns, one of them assisted by subjects of Khama, chief of the Bamangwato, advanced from the north east, the east, and the south-west respectively upon Buluwayo, the capital of Lobengula, who had succeeded his father Mosilikatse as chief of the tribe. The Matabele were easily overcome by means of Maxim machine guns, and fled to the hills. Towards the end of 1893 Lobengula sent overtures for peace, together with a sum of money, but the fatal cupidity of some men of the Bechuanaland Police prevented these from reaching the company's officials. Accordingly the Matabele who remained around the person of their chief,

enraged by the supposed rejection of their overtures, surrounded a small party of Englishmen under Major Wilson, who, unable to escape, fought desperately till all were killed. Lobengula died early in 1894, and all resistance was at an end. Matabeleland has since formed a part of the company's dominion, but a serious native revolt, partly due to the ravages of rinderpest and locusts, broke out in 1896. Mashonaland also revolted about the same time. The area of Rhodesia is about 750,000 square miles. The white population of Southern Rhodesia (area, 174,728 square miles) was 11,300 in 1901, of North-eastern Rhodesia, 164. The total native population of Southern Rhodesia is estimated at 510,000. The revenue in 1900-01 was £406,467, and the expenditure £633,849.

RHONDDA, a river and town of South Wales, in Glamorganshire. The river rises by two head streams to the west of Aberdare, and flows south-east to join the Taff at Pontypridd (which see). Its valley is of great natural beauty, and is now the seat of a large population engaged in coal-mining and metallurgical industries. The town of Rhondda, formerly called Ystradfyfodwg, is on the river, 8 miles north-west of Pontypridd. Among its buildings it has a modern church (1894) in Early English style, several other places of worship, schools, &c. The inhabitants are employed mainly in collieries, ironworks, &c. Pop (1891), 88,351, (1901), 113,735, of Rhondda parl div in 1901, 88,968.

RHYMNEY, a town in South Wales, chiefly in Monmouthshire, partly in Brecknock, on the river Rhymney, 22 miles N of Cardiff, has large collieries and an important brewery. Pop (1891), 7733, (1901), 7914. The river rises in Brecknockshire, flows south, forming the boundary between Monmouth and Glamorgan, and enters the Bristol Channel.

RHYS, JOHN, distinguished Celtic scholar, was born near Ponterwyd, Cardiganshire, on June 21, 1840, and educated at Bangor Normal College for the teaching profession. He kept a school in Anglesey till 1865, when he matriculated at Jesus College, Oxford, where he graduated with first class honours in classics. Elected fellow of Merton College in 1869, he continued his studies at the Sorbonne and Collège de France in Paris, and at Heidelberg, Leipzig, and Göttingen. In 1871 he was appointed an inspector of schools for Flint and Denbigh, and in 1877 he was appointed to the chair of Celtic in Oxford University, becoming in the same year an honorary fellow of Jesus College, of which he has been principal since 1895. He is honorary LL.D. of Edinburgh (1893). Professor Rhys had become known as a Celtic scholar by various contributions to periodicals before the publication, in 1877, of his *Lectures on Welsh Philology* gave him a high reputation in this department of scholarship. In 1882 he produced a popular account of Celtic Britain, and in 1887 his Hibbert lectures on the Origin and Growth of Religion as illustrated by Celtic Heathendom were published. Other works are *Studies in the Arthurian Legend* (1891), *The Early Ethnology of the British Isles* (1891—Rhind lectures of 1889), *Inscriptions and Languages of the Northern Picts* (1892), *Celts and Pre-Celts*, *The Welsh People* (1900), in collaboration with Mr J. B. Jones, and *Celtic Folk-lore* (1901). He has also edited various Welsh texts in conjunction with Mr J. G. Evans.

RICE PAPER, a substance prepared from thin, uniform slices of the snow-white pith of *Aralia* (or *Fatsia*) *papyrifera*, a small tree with large, downy, palmately-lobed leaves, and erect racemes of small flowers, which grows in Formosa. Rice paper is

prepared in China, and is used in the manufacture of artificial flowers and by native artists for water-colour drawings.

RICHARDSON, SIR BENJAMIN WARD, physician, born at Somerby, Lincolnshire, on Oct. 31, 1828, was educated at Barrow Hill School in his native county. He was apprenticed to a surgeon at Somerby, and became a student in Anderson's University, Glasgow, in 1847. Three years later he became a licentiate of the Faculty of Physicians and Surgeons of Glasgow, of which he was elected fellow in 1878. He received the degrees of M.A. and M.D. from St Andrews University in 1854, and in 1877 the senate conferred upon him the honorary degree of LL.D. In 1856 he became a member, in 1865 fellow, of the Royal College of Physicians in London. He was from 1867 a fellow of the Royal Society. He took up residence in London in 1853, and after filling various positions in connection with hospitals and dispensaries, he was appointed in 1892 physician to the London Temperance Hospital. He held various lectureships in connection with the Grosvenor Place School of Medicine, the Royal College of Physicians, the Glasgow Faculty, the College of Dentists, and other institutions, and in 1873 he was Croonian Lecturer to the Royal Society. He gained the Fothergillian gold medal in 1854 for an essay on diseases of the foetus, and the Astley Cooper prize in 1856 for an essay on coagulation of the blood. He presided over the meetings of the Social Science Association on several occasions, and in 1875 he delivered an important series of lectures before the Society of Arts on Alcohol. He was knighted in 1893, and died in London on Nov. 21, 1896. Richardson was an eminent pioneer in sanitary improvement, a staunch advocate of total abstinence from alcoholic liquors, and he introduced many new anaesthetics, numerous valuable drugs, and the lethal chamber. See his *Vita Medica* (1897), a posthumously published autobiography.

RICHMOND, SIR WILLIAM BLAKE, painter, was born in London on Nov. 29, 1843. He studied art in the schools of the Royal Academy, where he obtained two silver medals in 1857. Since then he has made many journeys to Italy, Greece, and Egypt in order to study the works of the ancient sculptors, architects, and painters. Among his works are *The Procession of Bacchus* (1865-8), *The Life of Woman* (1873), a series of frescoes, *Prometheus Bound* (1873), *Aradne abandoned by Theseus*, *Electra at the Tomb of Agamemnon* (1877), *Hercules releasing Prometheus* (1882), *The Ten Virgins*, *Hermes*, and portraits of Gladstone, Darwin, William Morris, Holman Hunt, &c. In 1878-83 he was Slado professor of fine art at Oxford, and in 1888 he was elected A.R.A., becoming full academician in 1895. He was created a knight bachelor in 1897, about the time when he began the work of decorating the interior of St Paul's Cathedral. In 1899 he became president of the Society of Miniature Painters.

RICKMANSWORTH, an old town of England, in Hertfordshire, on the river Colne, 18 miles north-west of St Paul's (London), with an interesting Perpendicular church (rebuilt in 1890 except the tower), town hall, almshouses, home for inebriates, &c. Pop (1891), 4769, (1901), 5627.

RIESA, a town in Saxony, in the circle of Dresden, on the left bank of the Elbe, at the Jahne confluence. It has railway, machine, and carriage works, forges, &c., and carries on a large river trade.

RIMU, a New Zealand tree (*Dacrydium cupressinum*) of the yew family. It grows to a height of 40 to 80 feet, and from 2 to 6 feet in diameter. The branches are pendulous and feathery, and the leaves slender and needle-like. Its brown wood is valued

for general building purposes. The young branches make good spruce beer. The tree is also called *red pine*.

RINGED SNAKE, a harmless colubrine snake (*Tropidonotus* or *Coluber natrix*), with teeth so small as to be incapable of piercing the skin. It is common in England, being found in woods, heaths, and hedgerows. It feeds on frogs, mice, young birds, &c., which it swallows alive. It is torpid during winter. Its length exceeds 3 feet, the head is of an ovate shape and distinct, the body long and cylindrical, and the tail tapering and about one fifth of the total length. Above, the colour is brownish gray tinged with light green, below it is bluish or leaden, longitudinal rows of black spots are found both above and below. The female is much larger than the male.

RIO GRANDE, a river of West Africa, which enters the Atlantic by an estuary opposite the Bisagos Islands. Its upper course is not well known.

RIO-GRANDE DEL NORTE, a river of the United States, rising in the San Juan Mountains in Colorado. It flows east for a few miles, afterwards turning southwards into New Mexico. From Paso del Norte it forms the boundary between Mexico and the state of Texas, and below Presidio it is navigable. Near its mouth in the Gulf of Mexico are the towns of Matamoros and Brownsville. The length from Presidio to the mouth is about 700 miles, the total length being roughly 1800. Its chief tributary is the Rio Pecos, flowing through New Mexico and Texas.

RIOJA, one of the western provinces of the Argentine Republic, north of San Juan and south of Catamarca. It is well watered on the west, but in the east and south there are salt and sand deserts. The climate is dry and healthy. The inhabitants are chiefly engaged in agriculture and cattle rearing. Excellent wheat, wine, and fruits are produced. Pop (1900), 77,783.—The chief town is RIOJA, at the foot of the Sierra Velasco, in the midst of vineyards and orange groves. Pop 8000.

RIOUW. See RHIO.

RISCA, town of England, in Monmouthshire, on the Ebbw, about 15 miles to the west of Newport, with which it is connected by rail. The parish contains coal and iron mines, a tinplate work, brick works, &c. Pop (1891), 7783, (1901), 9661.

RISHTON, an urban district of England, in Lancashire, 3 miles north east of Blackburn, with a modern church and chapels, an endowed school, paper and cotton spinning mills. Pop (1891), 6010, (1901), 7031.

RITCHIE, ANNE ISABELLA, writer of stories and other works, eldest daughter of W. M. Thackeray, was born in London in 1837, and educated at Paris and Kensington. In 1877 she married her cousin, Mr. Richmond Thackeray Ritchie, of the Civil Service. She began her career as an authoress by writing stories for the Cornhill Magazine while her father was editor of that periodical, and in 1863 published her first book, *The Story of Elizabeth*. It was followed by *The Village on the Cliff* (1865), *To Esther*, and other Sketches (1869), *Old Kensington* (1873), *Toilers and Spinners*, and other Essays (1873), *Bluebeard's Keys*, and other Stories (1874), *Miss Angel* (1875, the heroine being Angelica Kauffmann, the painter), *Anne Evans* (1880), *Madame de Sévigné* (1881—in *Foreign Classics for English Readers*), *A Book of Sibyls* (1883—dealing with Mrs. Barbauld, Miss Edgeworth, Mrs. Opie, and Miss Austen), *Mrs. Dymond* (1885), *Records of Tennyson, Ruskin, and the Brownings* (1892), *Lord Tennyson and his Friends* (1893), *Chapters from some Memoirs* (1894), and others. In 1898

she edited the Biographical edition of her father's works, each of the volumes being accompanied by valuable material bearing on his life, the circumstances in which the various works were written, &c.

RITSCHL, ALBRECHT, a distinguished German theologian, son of a Protestant bishop, was born in Berlin on March 25, 1822, and studied in the universities of Bonn, Halle, Heidelberg, and Tübingen. He qualified at Bonn as a lecturer in 1846, became extraordinary professor of theology there in 1852, and ordinary professor in 1859. In 1864 he accepted a call to the corresponding chair at Göttingen, where he died on March 20, 1889. From 1874 he was a consistorial councillor. In his early theses, *Das Evangelium Marcions* and *das kanonische Evangelium des Lukas* (The Gospel of Marcion and the Canonical Gospel of Luke, 1846), he adopted the position of his master, F. C. Baur, but in the first edition (1850) of his *Entstehung der altkatholischen Kirche* (Origin of the Early Catholic Church) he showed signs of divergence, and the publication of the second edition of the latter work in 1857 marked his complete severance from the Tübingen school. In the interval between the two editions he published *Über das Verhältnis des Bekenntnisses zur Kirche* (On the Relation of the Confession to the Church, 1854), and his chief subsequent works are *De Ira Dei* (1859), *Die christliche Lehre von der Rechtfertigung und der Versöhnung* (The Christian Doctrine of Justification and the Atonement, three vols. 1870-74, 3rd edition, 1888-89), his chief work, *Schleiermachers Reden über die Religion und ihre Nachwirkungen auf die evangelische Kirche Deutschlands* (Schleiermacher's Addresses on Religion and their Influence upon the Protestant Church of Germany, 1874), *Die christliche Vollkommenheit* (Christian Perfection, 1874), *Unterricht in der christlichen Religion* (Instruction in the Christian Religion, 1875, 5th edn, 1895), a succinct statement of his theological position, *Über das Gewissen* (On Conscience, 1876), *Geschichte des Pietismus* (History of Pietism, three vols. 1880-86), *Theologie und Metaphysik* (1881), *Drei akademische Reden* (Three Academic Addresses, 1887), *Fides Implicita* (1890), and *Gesammelte Aufsätze* (Collected Essays, 1893 and 1896). Ritschl founded a school of theology which is still of much importance both in Germany and in other countries. Starting from a subjective theory of cognition, based upon the philosophy of Kant as developed in Lotze, he sought to eliminate the whole metaphysical element from religion. He was thus led to reject such doctrines as original sin, the Trinity, the incarnation, whether historic or mystical, and the whole of natural theology, as of no religious value, and he denied the pre-existence and miraculous birth of Jesus. He condemned mysticism of every kind, regarding the relation of the believer to the Christian community, rather than his direct relation to God or Christ, as of vital importance for practical piety. He laid stress upon the historical character of Christianity, but he held free views of inspiration, and admitted the most advanced criticism. His view of the atonement was essentially the same as the 'moral influence' theory of liberal theologians. Taken altogether, his system was an attempt to mediate between the vanishing material and judicial theologies of the past and the advancing spiritual theologies of the future, and like all such attempts it has only temporary importance. Perhaps the most distinguished of the present German Ritschians is Prof. Adolf Harnack of Berlin. See the life by his son Otto (two vols. 1892-96), Pfeiderer's *The Develop-*

ment of Theology in Germany since Kant (1890, German edn., enlarged, 1891), and *Die Ritschlsche Theologie kritisch beleuchtet* (1891), *Schon's Les Origines Historiques de la Théologie de Ritschl* (1893), &c.

RITSCHL, FRIEDRICH WILHELM, German classical scholar, was born near Erfurt on April 6, 1806. After attending the gymnasiums at Erfurt and Wittenberg he went to Leipzig and Halle, where he devoted himself to classical studies. In 1832 he was appointed extraordinary professor at Halle University. He subsequently held professorships at Breslau and Bonn, and in 1865 accepted a call to Leipzig University, where he remained until his death, on Nov. 9, 1876. His chief work is a critical edition of Plautus's Comedies (three vols. 1848-54, incomplete, entirely remodelled edition, 1881-94, four vols.). His other works include *Purpurea Plautina et Terentiana* (1845), and *Priscæ Latinitatis Monumenta Epigraphica* (1864). He also contributed largely to philological journals, and his papers have been collected and published under the title *Opuscula Philologica*.

RITSON, JOSEPH, English literary antiquarian, was born at Stockton on Tees on Oct. 2, 1752, and died on Sept. 23, 1803. He became a conveyancer in London and deputy-high bailiff to the Duchy of Lancaster, and edited many old and rare books. He was noted for his industry and integrity, but was a quarrelsome critic. He assisted Sir Walter Scott in the preparation of his work on Border Minstrelsy. For some time before his death he was subject to nervous derangement, and at the last he was insane. His chief works are *A Select Collection of English Songs* (1783), *Ancient Songs from the Time of King Henry II. to the Revolution* (1790), a *Collection of Scottish Songs* (1794), *Robin Hood Poems* (1795), *Ancient English Metrical Romances* (1802), &c.

RIVIERE, BRITON, painter, was born in London on Aug. 14, 1840. He studied drawing under his father, who was a drawing master at Cheltenham College and afterwards at Oxford, and while resident in the latter city he entered St. Mary Hall, graduating B.A. in 1867 and M.A. in 1873. As early as 1858 he exhibited at the Royal Academy exhibition pictures with the titles *Rest from Labour* and *Sheep on the Cotswolds*, and soon after that date he worked as an illustrator for various English and American publications. In 1870 he settled in London, and since then he has been a constant contributor to the Royal Academy exhibitions. In 1878 he was elected an associate, and in 1881 a full R.A. Many of his pictures have been engraved. His strength, says one critic, 'lies not in subtle harmonies of tone and colour, nor in what may be called the lyric phase of design, idyllic invention and graceful movements, but in pathetic efforts, touching expressions, accomplished draughtsmanship, and in deep sympathy with the lives of men and dogs, the humour and the tragedy that belong to them.' Mr. Riviere is also known favourably as a sculptor by his *Anatomical Lion* (1888), *A Dying King (a lion—1894)*, and *The Last Arrow (a lion hunting scene—1896)*. In 1891 Oxford University conferred upon him the honorary degree of D.C.L. His wife is a granddaughter of Sydney Dobell.

ROBBIA, LUCA DELLA. See **DELLA ROBBIA** in SUPP.

ROBERTS, FREDERICK SLEIGH ROBERTS, EARL, British field-marshal, was born at Cawnpore, in India, on Sept. 30, 1832. His father, Sir Abraham Roberts, served with distinction in the Indian army, and his grandfather, the Rev. John Roberts, was a clergyman in Waterford, with which his family was associated for several generations. His paternal

great grandfather was John Roberts, architect of the Catholic cathedral, town-hall, and other buildings in Waterford, and two sons of the latter were known as painters. The wife of his great-grandfather was of Huguenot extraction. The future field-marshal was educated at Eton, the Royal Military College, Sandhurst, and the East India Company's cadet college at Addiscombe. In December, 1851, he was appointed a second lieutenant in the Bengal Artillery, and in April of the following year he joined his regiment at Dum Dum. A few months later he was appointed aide de camp to his father, who had received the command of the Peshawar division, and in due time was posted to a troop of horse artillery on the north-west frontier. His marked ability gave him a staff appointment as deputy assistant quartermaster general, and he was offered by John Lawrence a post in the Public Works Department, but declined it in order to adhere to a military career. Shortly before the outbreak of the great mutiny he met the celebrated John Nicholson. The Punjab movable column formed to assist in quelling the revolt was placed under the command of Brigadier (afterwards Field-Marshal Sir) Neville Chamberlain, who selected young Roberts as his staff officer, and he continued in this post when Chamberlain was succeeded by Nicholson. He took part in the siege of Delhi, being wounded in the back at one stage of the fighting. In September, 1857, he left Delhi at the head of a force bound for Cawnpore, where he arrived in October after having narrowly escaped death at Agra. He shared with distinction in Sir Colin Campbell's operations for the relief of the Lucknow garrison and others besieged in the Residency. On Jan. 2, 1858, he showed great gallantry in capturing a standard from two sepoys at Khudaganj at the risk of his life, an act for which he was awarded the Victoria Cross. He took part in the reoccupation of Fatehgarh and in the operations connected with the siege of Lucknow, which re-established British authority. He had been promoted lieutenant in June, 1857, and in April, 1858, he made over his office of deputy assistant quartermaster general to Wolseley and returned to the United Kingdom, where he married in May, 1859. Three months later he was again in India, and in Nov., 1860, he became captain and brevet major. In the Umbeyla (Ambela) campaign against the Wahabis on the north-west frontier in 1863 he again served under Sir Neville Chamberlain.

He was a staff officer in the Abyssinian campaign of 1868, and took Napier's final despatches to London after the storming of Magdala. Returning to Simla in 1869, he next saw service with the Lushai expedition of 1871-72. He had been brevetted lieutenant-colonel in 1868, and in 1872 he was created a Companion of the Bath. He was deputy quartermaster general during 1872-75, and in the latter year he was nominated by Lord Napier to the responsible post of quartermaster general, which he held till 1878. On the outbreak of war with Afghanistan late in 1878 Roberts, who had been raised to the brevet rank of colonel in 1875 and was promoted major general in Dec., 1878, was selected to command the Kuram field force. He began his advance into Afghanistan on Nov. 21, and nine days later turned a strong position of the enemy at Peiwar Kotal. Operations were suspended by the treaty of Gandamak, but the murder of the British ambassador, Sir Louis Cavagnari, led to a fresh outbreak of war in 1879, and General Roberts again received a command. After defeating the Afghans on Oct. 5 at Charasia, 11 miles south of Kabul, he occupied the capital, but the insufficiency of his

force compelled him to retire for a time to Sherpur, 2 miles to the north, until the arrival of Gough. Sir Donald Stewart, after a daring march from Kandahar north-east to Kabul, took over the command, and Abdurrahman was set up on the throne. News reached Kabul in the middle of 1880 of Ayub Khan's victory at Maiwand and occupation of Kandahar, and on August 6 Roberts was despatched with a field force of 10,000 picked men to recover Kandahar. For fully three weeks he and his men were lost to human ken in a hostile country, but on August 31 they reached Kandahar, and on the following day Ayub's force was completely defeated. The withdrawal of the troops was effected soon afterwards, and Roberts returned to England. He was received with great rejoicing and loaded with honours. Parliament voted its thanks, and he was advanced in the order of the Bath from the Knight Commandership, conferred in 1879, to the rank of G C B. He was also created a baronet in 1881.

In the beginning of 1881 he was sent to South Africa to assume the duties of governor of Natal and commander-in-chief against the Transvaal Boers, but peace was concluded while he was on his way out, and on landing he was at once recalled. In November of that year he went once more to India to succeed Sir Neville Chamberlain in the command of the Madras forces, a post which he held till 1885. From November, 1885, till his resignation in April, 1893, he was commander-in-chief in India, and with his departure for England in the latter year there ended the long connection with that country which he has described in his work, *Forty one Years in India* (from Subaltern to Commander in Chief (two vols 1897)). He had been raised to the peerage in 1892 as Baron Roberts of Kandahar and Waterford, and in 1893 he was created G C S I. In 1895 he was appointed commander-in-chief of the forces in Ireland, being at the same time sworn of the Privy council of Ireland. In the latter year also he attained the rank of field marshal, having already been promoted lieutenant general (1883) and general (1890). He was created a Knight of the Order of St Patrick in 1897. Towards the end of 1899 he resigned his post in Ireland in order to take up the supreme command in the South African War after the disasters of Stormberg, Magersfontein, and Colenso, and early in 1900 he arrived at Cape Town with Lord Kitchener as his chief of staff. After effecting the relief of Kimberley, capturing General Cronje and a large part of his force at Paardeberg, and assisting the relief of Ladysmith, he occupied Bloemfontein without opposition. A delay of some weeks was followed by a rapid advance north by way of Kroonstad and Vereeniging to Johannesburg and Pretoria, which were all occupied without opposition, though not without fighting on the way. Incidentally he had provided for the relief of Mafeking by columns under Colonels Mahon and Plumer. Towards the end of 1900 he resigned the command, after having annexed the republics by proclamation and declared the war ended, and he returned to England to receive further honours, while Lord Kitchener was left in Pretoria as commander-in-chief. Parliament voted him its thanks and a gift of £100,000, he was created a Knight of the Garter, and he was advanced in the peerage to the style of Earl Roberts of Kandahar, Pretoria, and Waterford, and Viscount St Pierre. Since 1900 he has been commander in chief in the United Kingdom, and in 1901 he was sworn of the British Privy council. He has received honorary degrees from Oxford, Cambridge, Dublin, and Edinburgh. Besides the work above

mentioned he has written *The Rise of Wellington* (1895). His only son and heir was killed at Colenso (1899), and his peerage will now descend by special remainder to his elder daughter.

ROBERTSON, THOMAS WILLIAM, dramatist and actor, was born at Newark on Jan. 9, 1829, and died in London on Feb. 3, 1871. His parents being actors, he early went on the stage, but was never a success. In 1853 he settled in London, where for several years he struggled on with light literature. In 1864 he had considerable success with *David Garrick*, a play produced by Sothorn, but his fame rests on a series of plays produced at the Prince of Wales' Theatre (1866-70), including *Ours* (1866), *Caste* (1867), *Play* (1868), *School* (1869), and *M P* (1870). Though sneered at on their production by certain critics and nicknamed 'cup- and saucer dramas', they have deservedly secured a permanent place on the stage. *Caste* is generally regarded as his masterpiece. His principal Dramatic Works (two vols.) were published in 1890 by his son.

ROCHEFORT, HENRI (VICTOR HENRI, COMTE DE ROCHEFORT LUCAY), a French journalist, dramatist, and politician, was born in Paris on July 29, 1832. Here he at first studied medicine, but on the death of his father, in 1851, he obtained a post in the prefecture. In 1859 he wrote for the *Charivari*, and he became one of the principal writers on the *Figaro*. Having been dismissed from the latter post by order of the ministry, he founded a weekly paper called *La Lanterne* in 1868, in which he vigorously attacked the emperor and the ministry. It was seized early in its career by the police, and Rochefort was fined and imprisoned. In 1869 he was returned to the legislative assembly by the first arrondissement of Paris. He then started a new paper, the *Marseillais*, and for its attacks on the imperial family he was sentenced to six months' imprisonment in Jan., 1870. After Sedan he became a member of the government of National Defence. He fled from Paris in May, 1871, when he foresaw the end of the Commune, of which he had been a vigorous supporter, but was arrested by the Versailles government and sentenced to transportation to New Caledonia. He escaped in 1874, and after the general amnesty of 1880 returned to Paris (July 12), where he founded his new journal the *Intransigent*. He was returned as deputy by the department of the Seine, but resigned his seat in Feb., 1886. His influence suffered from his joining in the Boulangist movement, and by his support of the anti Semites during the Dreyfus agitation he forfeited the friendship of many of his political allies.

ROCK ROSE. See CISTUS in SUPP.

RODRIGUEZ, an island in the Indian Ocean, 344 miles east of Mauritius, of which British colony it is a dependency. It is 18 miles long by 7 broad, and has an area of about 45 square miles. The climate is healthy, but there are frequent hurricanes. The soil is very fertile. The exports include maize, beans, cattle, fish, poultry, and fruit. The capital is Port Mathurin, on the north coast.

ROEBUCK, JOHN ARTHUR, English politician, was born at Madras in 1802, and died on Nov. 30, 1879. He was called to the bar in 1831, and became a queen's counsel in 1843. In the reformed parliament of 1832 he was returned for Bath as an advanced Liberal. He lost his seat in 1837, regained it in 1841, only to lose it again in 1847. Sheffield returned him in 1849, and he represented that city till 1868 and again from 1874 till his death. He defended the Crimean war, and it was by his motion to appoint a committee to inquire into the condition of the army before Sebastopol that the

Aberdeen ministry was overthrown His denunciation of trades unions lost him his seat in 1868, but he regained it in 1874 He gave his support to the Eastern policy of Lord Beaconsfield In 1878 he was nominated a member of the privy council He published a work on the Colonies of England (1849) and a History of the Whig Ministry of 1830 (1852)

ROGERS, HENRY, clergyman and essayist, was born at St Albans on Oct. 18, 1806, and educated privately He was apprenticed to a surgeon in 1823, but he afterwards studied at Highbury College and became a Congregationalist minister at Poole, Dorsetshire, in 1829 Three years later he was appointed lecturer on rhetoric and logic in Highbury College, and in 1836 he received the professorship of English language and literature in University College, London He was selected in 1839 to fill the chair of English language and literature, mathematics, and mental philosophy in Spring Hill College, Birmingham, and he held that office till his appointment, in 1858, as principal and professor of theology in the Lancashire Independent College He died at Pennal Tower, Machynlleth, on Aug. 20, 1877 One of his earliest works was *Poems, Miscellaneous and Sacred* (1826), and in 1836 he published his book on *The Life and Character of John Howe* From 1839 he contributed regularly to the *Edinburgh Review*, some of his contributions to that periodical being collected in *Essays, Critical and Biographical* (1874), and *Essays on some Theological Controversies* (1874) His chief work, *The Eclipse of Faith*, a piece of skilful dialectics, was published anonymously in 1852, being followed in 1854 by a *Defence of The Eclipse of Faith*, in which he replied to F W Newman's reply to his earlier work He also edited the works of John Howe (1862-63, six vols.)

ROGERS, JAMES EDWIN THOROLD, writer on economic history, was born at West Meon, Hants, in 1823 He received his earlier education at Southampton and King's College, London, whence he proceeded to Magdalen Hall, Oxford, in 1843, graduating B A with a first in classics in 1846 He was a staunch Tractarian and took orders shortly after graduating, but in 1870 he availed himself of the then recently passed Clerical Disabilities Relief Act to resign his orders For some time he remained at Oxford as a tutor in classics and philosophy, and published several works on Aristotle, &c In 1859 he became Tooke professor of statistics and economic science at King's College, London, a post which he occupied till his death From 1862 till 1867 he was Drummond professor of political economy at Oxford, but owing to his advanced views he was not re-elected In 1883 he became lecturer on economics at Worcester College, and on the death of Bonamy Price, in 1888, he regained his old chair, which he held till his death at Oxford on Oct. 12, 1890 Rogers was very intimate with Cobden, for whose character and opinions he had a great admiration, and he also came into contact with Bright He sat for Southwark from 1880 to 1885 as an advanced Liberal, and on the redistribution of seats in 1885 he was elected for Bermondsey In 1886 he stood for re-election as a Home Rule candidate, but failed to retain his seat His greatest work is his scholarly and exhaustive *History of Agriculture and Prices in England from the Year after the Oxford Parliament (1259) to the commencement of the Continental War (1793)*, published in eight vols 1866-93 Based on this colossal work is his *Six Centuries of Work and Wages* (1884, 3rd edit. 1890), and his other works

include *Education in Oxford, its Methods, its Aids, and its Rewards* (1861), *Historical Gleanings* (1869), an edition of the *Wealth of Nations* (1869), *Social Economy* (1871), *Complete Collection of the Protests of the Lords, with Historical Introductions, &c* (three vols. 1875), *The British Citizen, his Rights and Privileges* (1885), *Holland (Story of the Nations, 1888), Relations of Economic Science to Social and Political Action* (1888), *The Economic Interpretation of History* (1888), and *Industrial and Commercial History of England* (1892)

ROGGEVELD MOUNTAINS, a range in the south western division of Cape Colony, running north west to south-east with an average height of 5000 feet They form a western continuation of the Nieuwveld Mountains On the northern slope the town of Sutherland is situated

ROHLFS, FRIEDRICH GERHARD, a celebrated African traveller, was born on April 14, 1831, at Vegesack, Germany He studied medicine in Heidelberg and Göttingen, and in 1855-60 he served with the French in Algiers as surgeon in the foreign legion In 1860 he travelled through Morocco dressed as a Mussulman, and explored the Tafilet Oasis in 1862 In 1863, and again in 1865, he travelled in North Africa, making his way on the latter occasion from Tripoli to Lake Tchad, Bornu, &c, and finally to Lagos on the west coast He joined the British Abyssinian expedition in 1867 In 1868 he travelled in Cyrenaica, and in 1873-74 he conducted an expedition through the Libyan Desert He travelled across North America in 1875-76, and in 1878 he undertook a new journey to Africa, and penetrated to the Kufra Oasis In 1880 he visited Abyssinia He was appointed German general consul at Zanzibar in 1884, returned in 1885, and died at Rungsdorf on June 2, 1896 His works include, among others *Journey through Morocco* (1869), *Land and People of Africa* (1870), *Across Africa* (1874-75), *Journey from Tripoli to the Kufra Oasis* (1881), *My Mission to Abyssinia* (1883)

ROHRI, a town of India, Shikarpur District, Sind, Bombay, on the west bank of the Indus, and a station on the North-Western State Railway It contains the War Mubarak, a building in which is kept a hair supposed to have formed part of Mohammed's beard The hair is shown to the public once a year, and miraculous properties are ascribed to it Pop (1891), 10,224

ROHTAK, a town of India, capital of a district of the same name in the Punjab, 42 miles north-west of Delhi It has a local trade in grain, and cotton turbans are manufactured Pop (1891), 16,702

ROLLS SERIES, the series of English publications issuing from the Record Office under the control of the master of the rolls It was begun in 1857 in accordance with a scheme submitted by Lord Romilly, the master of the rolls at that time, and comprises most of the chief English chronicles and many highly important historical documents The editors of the volumes are among the most scholarly English students of English history, and their introductions are often of great value

ROMANES, GEORGE JOHN, distinguished scientist, was born on May 20, 1848, at Kingston, Canada, where his father was a clergyman and professor of Greek In 1867 he entered Gonville and Caius College, Cambridge, where he pursued the study of physiology In 1873 he won the Burney prize for an essay on *Christian Prayer and General Laws*, and about this time began his long friendship with Darwin In 1874-76 he worked under Burdon Sanderson in the laboratory of University College,

London, and carried out important researches in nervous excitability, which formed the subject of his Croonian lecture in 1876. In 1879 he was elected fellow of the Royal Society. In 1878 he published, under the pseudonym *Physicus*, a work entitled *A Candid Examination of Theism*, in which he took up a somewhat atheistic position. Subsequently his views underwent considerable change, and towards the close of his life he was engaged on *A Candid Examination of Religion*, in which he returned to theistic beliefs. His notes for this work were published after his death, under the title *Thoughts on Religion*. He died at Oxford on May 23, 1894. Romanes was an ardent supporter of Darwin and the evolutionists, and in various works sought to extend evolutionary principles to mind both in the lower animals and in man. His chief remaining works are *Animal Intelligence* (1881), *Scientific Evidences of Organic Evolution* (Nature Series, 1882), *Mental Evolution in Animals* (1883), *Jelly fish, Star fish, and Sea Urchins* (International Scientific Series, 1885), *Mental Evolution in Man* (1888), *Darwin and after Darwin* (1892-95), *Examination of Weismannism* (1893), *Mind and Motion, an Essay on Monism* (1895). In 1896 appeared a volume of *Essays*, and also his *Life and Letters*, the latter edited by his wife.

ROMANSCH, RUMONSCH, one of the Romance family of languages, spoken in parts of Switzerland (Grisons), the Tyrol, &c. In some parts it is known as the *Ladina*, that is Latin, which forms the basis of it. The literature is mainly religious.

ROMFORD, a market town of England, in Essex, on the river Rom, about 12 miles E.N.E. of London. It has a large brewery producing a well known ale, extensive market gardens, and important corn and cattle markets. Pop. (1891), 8408, (1901), 11,656.

ROMNEY, GEORGE, an English painter, was born at Beckside, near Dalton in Furness, Lancashire, on 15th December, 1734. His father was a cabinet maker, and the boy learned this trade, but he also taught himself drawing and carved wood, and at the age of nineteen he was apprenticed to a portrait painter at Kendal named Steele. In 1757 he entered on his own career as portrait painter, and after a certain amount of local success went up to London (1762), leaving his wife (whom he married in 1756) and his two children in Kendal. The following year he won a prize offered by the Society of Art for a historical painting, and he rose steadily in popularity until he held a position beside Reynolds and Gainsborough as a portrait painter. There were few incidents of importance in the thirty-five laborious years which cover the period of his life in London, except that he made two visits to France—in 1764 and 1790—and resided in Italy during the years 1773-75. While in Italy he gave much attention to the works of Correggio, and this, along with his study of the undraped model, greatly influenced his after-work. In 1783 Romney made the acquaintance of Emma Hart, afterwards the celebrated Lady Hamilton, and she became the model from which he painted such well known pictures as *St. Cecilia*, *Joan of Arc*, *A Magdalene*, *A Bacchante*, and *Sensibility*. Gradually he began to withdraw from portrait-painting, and gave more time to historical and imaginative work. In 1786 Alderman Boydell founded his famous Shakespeare gallery, to which Romney contributed a scene from the *Tempest* and the *Infant Shakespeare* attended by the *Passions*, while about this time he painted *Milton* and his *Daughters*, and Newton making Experiments with the *Prism*. In order to find room for these great imaginative pictures he erected a large studio at

Hampstead, which he occupied in 1797. But his health at this time began to fail, and in the summer of 1799 he returned to Kendal utterly weakened in body and mind. He had only seen his wife twice since he left her thirty-five years before, yet she received the poor imbecile and nursed him faithfully until his death on November 15, 1802. The art of Romney displays a certain fitfulness of achievement which was due partly to the instability of his character, and partly to his defective early training. His defects of technique are most apparent in his historical and imaginative subjects, it is only when we examine his portraits, and especially his female portraits, that we find that beauty of form and subtle charm of colour which place him among the greatest portrait painters of the eighteenth century.

ROMNEY, New, a small but ancient municipal borough of England, in Kent, one of the Cinque Ports, 14 miles to the south east of Ashford, formerly on the coast, but now some distance inland, though in recent years several buildings have been erected on the coast. It formerly had five parish churches, but only that of St. Nicholas, restored in 1884, remains. From the fourteenth century till 1832 it returned two members to parliament, but the First Reform Act disfranchised it. Pop. (1891), 1366, (1901), 1327.—**OLD ROMNEY**, 3 miles west of New Romney station, contains the old church of St. Clement, of mixed Early English and Decorated styles.

RÖNTGEN, WILHELM KONRAD, German physicist, world famous as the discoverer of the Röntgen or x rays, was born at Lennepe, in Rhenish Prussia, on March 27, 1845, and was educated at Zürich under Kundt. Qualifying as a lecturer in 1869, he went to Würzburg in the following year as assistant to Kundt, and in 1872 he removed to Strasburg. After a short period as professor in the academy at Hohenheim, he was appointed in 1876 extraordinary professor of physics in Strasburg University, and in 1879 he accepted the ordinary professorship of the same subject at Giessen. Since 1888 he has held a like position in the University of Würzburg. He has carried out several important physical investigations, but he is known chiefly by his great discovery of 1895, for which see **RADIOGRAPHY** in SUPP.

RÖNTGEN RAYS. See **RADIOGRAPHY** in SUPP.

ROOT STOCK. See **RHIZOME** in SUPP.

ROSCOE, SIR HENRY ENFIELD, a distinguished chemist, grandson of William Roscoe, the historian, was born in London on Jan. 7, 1833. Educated at Liverpool High School, University College, London (B.A. 1852), and Heidelberg, Roscoe on his return to England devoted himself to science, especially chemistry, in which he has done some most useful and brilliant work. From 1858 till 1886 he was professor of chemistry at Owens College, Manchester, and from 1885 to 1895 he represented South Manchester in parliament in the Liberal interest. Honours of all kinds have flowed in upon him from the universities (LL.D. Cantab. 1883, D.C.L. Oxon. 1887) and learned societies (Royal Society's gold medal, 1873), and in Nov. 1884 he was knighted. He has sat on various Royal Commissions, such as those on noxious vapours, secondary education, and technical instruction, and in 1887 he presided over the Manchester meeting of the British Association. In 1896 he was appointed vice-chancellor of the University of London. His works include *Investigations on the Chemical Action of Light*, *Lessons in Elementary Chemistry*, a very popular work which has been translated into many languages, *Lectures on Spectrum Analysis* (1869), and, with Professor Schorlemmer, *A Treatise upon Chemistry* (three vols. 1878-89).

ROSEAU, the capital of the island of Dominica (which see). It is situated on the southern portion of the west coast of the island. It is also called *Charlottetown*.

ROSE BAY, the name of several plants, as, (a) the *Nerium Oleander*. See **OLEANDER**. (b) The dwarf rose bay, a plant of the genus *Rhododendron*, having handsome flowers. (c) *Epilobium angustifolium*, or French willow. See **EPILOBIUM** in **SUPP**.

ROSEBERRY, **ARCHIBALD PHILIP PRIMROSE**, fifth EARL OF, statesman and author, son of Archibald, Lord Dalmeny, and grandson of the fourth Earl of Rosebery, was born in London on May 7, 1847. He was educated at Eton and Christ Church, Oxford, and in 1868 he succeeded his grandfather in the earldom. He made his first parliamentary speech in 1871 in seconding the address in reply to the royal speech, and in the following year he was appointed a commissioner on Scottish endowments. In 1874 he served on several committees, and in that year he was president of the Social Science Congress, then meeting at Glasgow. He married in 1878 Hannah, daughter and heiress of Baron Meyer de Rothschild, but his wife died in 1890. He was lord rector of Aberdeen University in 1878-81, of Edinburgh University in 1880-83, and of Glasgow University in 1899-1902. In 1881 he succeeded Mr Leonard Courtney as under secretary for home affairs, but, resigning in 1883, he became first commissioner of works in 1884. He again held office under Mr Gladstone during his short lived ministry of 1886, this time in the important position of secretary for foreign affairs. Lord Rosebery at once accepted Mr Gladstone's Irish Home Rule policy in that year, and was therefore in opposition during the six years 1886-92. In 1889-90, and again in 1892, he did useful work as chairman of the London County Council. When Mr Gladstone again took office, in 1892, Lord Rosebery became once more secretary of state for foreign affairs, and in this capacity showed a marked determination to uphold British interests with firmness in south eastern Asia and elsewhere. On Mr Gladstone's retirement early in 1894 he became prime minister and lord president of the council, but his appointment met with much opposition from the more Radical section of his party, which adhered to Sir William Harcourt. His attitude regarding Home Rule for Ireland, which he declared could not be achieved until England, 'the predominant partner', was converted, and his support of the principle of a second chamber, were considered unsatisfactory by many of the Liberal party. In regard to other questions of Liberal policy, Lord Rosebery gave a general adherence to 'the Newcastle programme', laying special emphasis upon Welsh disestablishment, though obviously lukewarm on the question of Scottish disestablishment. Several defeats sustained by the government in the early part of 1895, the last on the question of ammunition raised in committee on the army estimates, led to the resignation of the ministry and the general election of that year, which resulted in a great triumph for the Conservative Unionist party. In October, 1896, Lord Rosebery resigned the leadership of the Liberal party, because, unlike many Liberals, including Gladstone, he supported the new government in refusing to act vigorously in regard to the Armenian atrocities. During the trouble with France in connection with Major Marchand's occupation of Fashoda in 1898 he supported the ministry in several public speeches. Except on occasions of this nature, he maintained almost complete silence in regard to political questions until Dec 16, 1901, when his return to political life was signaled by a much-debated speech delivered at

Chesterfield. In this speech he definitely abandoned the traditions of Gladstonian Liberalism. Education, housing of the poor, and the temperance problem he mentioned as three questions of urgent importance. He urged the Liberal party to take up the 'sentiment of empire', and in regard to the South African war, while mainly defending the past policy of the government, he declared himself against the policy of unconditional surrender, and in favour of a 'regular peace and a regular settlement' brought about, if possible, by negotiation with the exiled Boer authorities in Holland. He definitely threw over the Irish alliance, and in some utterances soon afterwards distinctly abandoned Home Rule, at least in the Gladstonian sense. He refused to associate himself with the Liberal party, but several Liberals of the Imperialist type gave up their previously complete adherence to the government's war policy and rallied to him. Thereupon a Liberal League was formed with Lord Rosebery as its president, its chief aim being apparently to 'imperialize' the Liberal party. Lord Rosebery has been attacked by many, especially Nonconformists, for his connection with horse racing, in which sport he has been very successful. In 1888 the University of Cambridge conferred upon him the honorary degree of LL.D. In 1892 he was created a Knight of the Garter. He is generally recognized as a fluent, graceful speaker on literary and historical subjects. His published works are: William Pitt (1891), Sir Robert Peel (1899), and Napoleon (1900), besides a volume of Appreciations and Addresses (1899). See the over-eulogistic Lord Rosebery: his Life and Speeches (1900), by T. Coates.

ROSMINI SERBATTI, **ANTONIO**, modern Italian philosopher, was born at Rovereto, Tyrol, on Mar 25, 1797, and died at Stresa on July 1, 1855. He entered the priesthood and founded the charitable order of Rosminians, which has branches in Italy, France, Britain, and America. He is regarded as the founder of modern Idealism in Italy. The chief points of his system are fully treated in his New Essay on the Origin of Ideas (1830), translated into English, 1883. He was a most voluminous writer on religious and miscellaneous subjects as well as on philosophy.

ROTH, **RUDOLF VON**, German Sanskrit scholar, born at Stuttgart on April 3, 1821, studied at Tübingen, Paris, and London. He qualified in 1845 as a lecturer at Tübingen, where in 1848 he became extraordinary, in 1856 ordinary professor of oriental languages. In the last mentioned year he was also appointed head of the university library at Tübingen, and this post, together with his professorship, he held till his death on June 24, 1895. He is best known for the great Sanskrit-Wörterbuch (Sanskrit Vocabulary, seven vols., 1853-75) which he prepared in collaboration with Bohtlingk, but he also published other important works, among them an edition of the Atharva Veda (with Whitney, 1855-56).

ROTHWELL, a town of England, in Northamptonshire, near the right bank of the river Ise, 14 miles north by east of Northampton, with an ancient church of much interest, chapels, ancient market-house, hospital for widowers, &c., manufactures of boots and shoes, agricultural implements, &c. Pop (1891), 3378, (1901), 4193.—Another **ROTHWELL** is a town in Yorkshire (W. Riding), 5 miles south east of Leeds, with an Early English church, ruins of a castle, manufactures of rope and twine, matches, &c., and collieries adjacent. Pop (1891), 6205, (1901), 11,702.

ROUNDELAY, a sort of ancient poem, consisting of thirteen verses, of which eight are in one kind of rhyme and five in another. It is divided into couplets, at the end of the second or third of which

the beginning of the poem is repeated. The word is now generally employed in a looser sense.

ROUNDERS, a game played with a bat and a ball by two parties or sides, on a piece of ground marked off into a square or circle or pentagon, with a batter's station, and three (or more) goals or bases at equal distances. On the ball being thrown towards him the batter tries to drive it away as far as he can and run completely round the goals, or over any one of the four parts, before the ball can be thrown back to the batting station. The batter is declared out if he fails to secure a run after having had three balls, if a fielder returns the ball so as to strike him while running, or if the ball from his bat is caught in the air by one of the fielders. See **BASE BALL** in SUPP.

ROUTH, EDWARD JOHN, writer on dynamics and statics, was born in Quebec on Jan. 20, 1831, being son of Sir Randolph Routh, K.C.B., commissary general to the forces. Coming to England in 1842, he studied at University College, London, where he graduated M.A. after a distinguished career in mathematics. From London he went to Cambridge where he studied at St. John's and Peterhouse Colleges, graduating as senior wrangler in 1854. Soon afterwards he became a lecturer on mathematics at Cambridge, and continued coaching for the tripos till 1888. Among his seven hundred pupils were no less than five hundred wranglers, twenty-seven of these being senior wranglers. He is a member of many learned societies and has received the honorary degree of LL.D. from the University of Glasgow (1879). His published works include a well-known treatise on *Rigid Dynamics* (1860, two vols.), *Stability of a Given State of Motion* (Adams Prize Essay, 1877), *Analytical Statics* (1891, two vols.), *Dynamics of a Particle* (1898), and many papers in mathematical journals, &c. His wife is the eldest daughter of the late Sir George Airy.

ROWLEY REGIS, a town of England, in West Staffordshire, 8 miles west from Birmingham. There are several churches and dissenting places of worship, and a number of schools. The coal and iron trades, steel works, brick and tile kilns, and malting are carried on here. The district abounds with coal and iron stone, together with an excellent clay. A hard rock known as Rowley Rag is obtained from the quarries. Pop. (1891), 30,791, (1901), 34,669.

ROYAL ARMY MEDICAL CORPS, the name now given to the medical department of the British army, organized under a Director General, assisted by an administrative staff of over eight hundred officers ranking as surgeon-major generals, colonels, lieutenant colonels, &c., besides civil surgeons, quarter masters, and apothecaries. The corps in time of peace consists of nineteen companies besides the depot. The depot and three companies are stationed at Aldershot, two companies at Netley, and there is one company in each of the other military districts of the United Kingdom. In all there are about forty warrant officers, nearly seven hundred staff-sergeants, sergeants, corporals, &c., and about two thousand privates. The corps is employed in time of peace only in the United Kingdom and the colonies, and not in India. In time of war a surgeon is attached to every unit, such as the battalion, cavalry-regiment, &c., and under him are two trained ambulance men for each company, together with a corporal and a private. Each brigade of infantry or cavalry has attached to it a medical section or bearer company, consisting of a major, two captains or lieutenants, and fifty-seven men, besides horses, wagons, &c. These are assisted by a company of the Army Service Corps attached to the brigade. While an engagement is proceeding, part of the

bearer company forms a 'collecting station' under a sergeant, and part forms a 'dressing station' beyond the zone of fire under a major, while the remainder is mainly occupied in carrying the wounded to these stations. From the dressing stations the wounded, after receiving preliminary treatment, are taken to the field hospitals of which there is one to every brigade, besides others with the corps and divisional troops. Each has one hundred beds, and is under a lieutenant colonel, a major, and three other officers, with one warrant officer and thirty-four men, assisted by a part of the Army Service Corps. The wounded are afterwards removed to stationary hospitals on the line of communications, which do not follow the movements of the troops, but those who are not too seriously injured are removed at once from the field hospital to a general hospital at the base. There are two permanent general hospitals in the United Kingdom, namely the Royal Victoria Hospital at Netley and the Herbert Hospital at Woolwich. The officers and men of the R.A.M.C. are also employed in the various garrison hospitals, each of which is under a surgeon with the rank of lieutenant colonel major. The duties of the R.A.M.C. are as varied and extensive as they are important, and the wonderful efficiency of its organization together with the unfailing courage and devotedness of its members on the battle field have done much to relieve the intrinsic horror of war, whilst emphasizing in the noblest way its supreme illogicalness.

ROYAL COLLEGE OF MUSIC, an institution established in 1883 in South Kensington under the presidency of the Prince of Wales, afterwards Edward VII. It was endowed at its commencement by gifts to the amount of £126,000. Pupils of both sexes are admitted either as fee-paying students or as scholars or exhibitioners. There are fifty-two open free scholarships and eleven close free scholarships, besides the council exhibitions, the Savage Club exhibition, the exhibitions of the associated board of the Royal Academy of Music (which see) and the Royal College of Music, &c. Prizes and medals are also awarded to the students in accordance with the results of examinations. The associateship may be obtained by outsiders as well as pupils on passing a qualifying examination, and entitles the holders to use the initials A.R.C.M. The professional staff includes several eminent names.

ROYAL UNIVERSITY OF IRELAND, an institution founded in 1880 in pursuance of the provisions of the University Education (Ireland) Act, 1879, to take the place of the Queen's University, a similar institution established in connection with the Queen's Colleges (which see). The Royal University corporation consists of a chancellor, a senate, and graduates, the government being vested in the chancellor and senators, the latter not to exceed thirty-six in number. It has power to confer all such degrees and distinctions as are conferred by any university in the United Kingdom except in theology, and these may be bestowed on all male and female students who have matriculated in the university and passed the prescribed examinations, no residence in any college or attendance at any course of instruction in the university being obligatory on any candidate for a degree other than a degree in medicine or surgery, the university in this respect resembling that of London. An act of 1881 provided for the payment of £20,000 a year out of the surplus funds of the Irish Church for the purposes of the university. The university has a considerable staff of examiners, but of course no professors. A certain number of exhibitions and scholarships are conferred on those who pass examinations with high distinction.

ROYAN, a seaport and bathing town of France, in the department of Charente-Inférieure, at the mouth of the Gironde. It has naval works and an important sardine fishery. Pop (1896), 6864.

ROYSTON, a market town of England, in Hertfordshire, 13 miles s s w of Cambridge. Pop (1891), 3318, (1901), 3517.

ROYSTONE, an urban district of England, in Yorkshire (W. Riding), with an ancient church, grammar school, &c. Pop (1891), 2613, (1901), 4397.

ROYTON, a large village of England, in the county of Lancaster, adjoining Oldham on the north. It has a town-hall with market hall adjoining (opened in 1880), a parish church, several other places of worship, and a number of good schools. Royton contains extensive cotton manufactories. Pop (1891), 13,395, (1901), 14,881.

RSHEV, a town of Russia, in the government of Tver, on the Volga, carrying on a large river traffic and hemp spinning. Pop 35,810.

RUBINSTEIN, ANTON GRIGORYEVITCH, a Russian composer and pianist, was born of Jewish parents at Wechotynetz, near Jassy, on Nov. 30, 1830. He received his musical training from his mother, and afterwards from a teacher in Moscow. In 1839 he made an extensive European tour, playing on the piano to enthusiastic audiences, and in 1842 he visited England. He then studied for eighteen months in Paris, studied and taught at Berlin and Vienna, and returned to Russia in 1848, where he devoted himself to further study and to composing until 1856. On his reappearance in the concert room his fame was at once assured by his phenomenal skill on the pianoforte, and his numerous tours, which extended to America, formed a series of unbroken successes. In 1858 he established his headquarters at St. Petersburg, and assisted largely in the foundation of the Conservatoire in 1862, of which he was principal until 1867. In 1869 he was ennobled by the czar. As a composer he was very prolific, being especially happy in his pianoforte pieces. Some of his symphonies, particularly his Ocean Symphony and Dramatic Symphony, have achieved considerable popularity. His operas have had but a qualified success. They are mostly on sacred subjects, including such titles as *The Macca-bees*, *Paradise Lost*, and *Sulamith*, and were composed on anti-Wagnerian principles. He died near St. Petersburg on Nov. 20, 1894. He had previously published an autobiography.

RUDD (*Leuciscus erythrophthalmus*), a fish of the carp family, having the back of an olive colour, the sides and belly yellow, marked with red, the ventral and anal fins and tail of a deep red colour. It is common in Great Britain and throughout Europe. Its average length is from 9 to 15 inches.

RUFUJI, or **LUFUJI**, a river of German East Africa, entering the Indian Ocean opposite the island of Mafia. It is formed by the junction of the Luweo or Luvu, rising in the Livingstone mountains north-east of Lake Nyassa, and the Ulanga or Uranga, rising farther north. Near the confluence are the Shugali Falls, and some distance below the river receives the Ruaha on its north bank. It forms a large delta. Some of the branches of the delta are navigable, and above it the river is practicable for light boats for some 120 miles.

RURKI, or **ROORKEE**, a manufacturing town in Saháranpur district, North West Provinces, Hindustan, on the Soláni, some 20 miles east of Saháranpur, is the seat of the Ganges Canal workshops and iron-foundry, and the Thomason Civil Engineering College. Pop (1891), 17,376.

RUSHDEN, a town of England, in Northamptonshire, with an ancient church of some interest, and

manufactures of boots and shoes, &c. Pop. (1891), 7443, (1901), 12,460.

RUSKIN, JOHN, English writer on art, social economy, and many other subjects, and one of the greatest masters of English prose, was born in London on Feb. 8, 1819. His father was John James Ruskin (1785-1864), who came from Edinburgh to London in 1807, and with two others started in business as a wine merchant, and his mother was Margaret Cox (1781-1871), a cousin of her husband. The elder Ruskin was a good man of business, 'an entirely honest merchant' according to his son's epitaph, with fine literary and artistic tastes. He had studied painting in his youth, and throughout his life spent much in the purchase of works of art, and formed many friendships with artists. His wife was a woman of fine character and strict puritanical religious views, and to her the future author owed his intimate knowledge of the English Bible, which more than anything else contributed to form his style. Young Ruskin and his mother accompanied his father on his annual business journey, and in this way, before he completed his tenth year he had visited the greater part of England and Wales and southern Scotland, and had seen many of the best pictures in private collections. From 1833 onwards for many years the annual journey of the family was made on the Continent, and Ruskin thus extended his acquaintance with natural scenery and with the works of the old masters. His education in the special sense was at first conducted by his mother and private tutors at home, but he afterwards spent two years at a Camberwell school and attended lectures at King's College, London. He was also trained in drawing, and as early as 1832 he came under the spell of Turner. In 1836 he went to Oxford, where he became a gentleman-commoner at Christ Church, but, partly owing to threatened consumption and partly to his own individuality and tastes, his career there was undistinguished, though in 1839, after two failures, he won the Newdigate prize for a poem on *Salsette and Elephanta*. He graduated B.A. in 1842, and proceeded M.A. in the following year. His first published works were essays in *Loudon's Magazine* of Natural History on geological and allied subjects (1834 and 1836), and in 1837-38 he wrote for *Loudon's Architectural Magazine* on *The Poetry of Architecture* (separately published, 1893). An attack upon some of Turner's pictures in *Blackwood's Magazine* in 1836 led him to formulate the plan of his masterpiece, *Modern Painters*, the first volume of which appeared in 1843 as *A Graduate of Oxford*. The second volume was published in 1846, the third and fourth in 1856, and the fifth in 1860 (complete edition, imperial 8vo, with all the original and three new plates, six vols., 1888, or 8vo edition, with reduced plates, six vols., 1897). At first intended as a defence of Turner, the work from the first assumed a wider scope, and latterly became a comprehensive treatise on the principles of art. He sought to show the immense superiority of the best modern landscape painters, especially Turner, to all the ancients, and he supported the spiritual against the sensuous theory of art with an eloquence and a width of knowledge which have indeed wrought, as Sydney Smith predicted, 'a complete revolution in the world of taste'. The descriptions of natural scenery in the book are justly regarded as priceless gems of word-painting, and the sense of the indissoluble association of art with all other branches of human activity, so characteristic of Ruskin, became increasingly marked as the work progressed. His name was not put on the title-page till 1851.

After the publication of the first volume of *Modern*

Painters he continued his studies and his travels, and it was during a visit to Venice that he definitely decided for literature as his main work. In 1848 he married Euphemia Chalmers Gray, the nineteen-years-old daughter of a Scottish lawyer, for whom he had written in 1841 his fairy tale, *The King of the Golden River* (published 1851). His married life was not very fortunate, and in 1854 the marriage was annulled, and the lady married Millais in 1855. *The Seven Lamps of Architecture* (1849, 3rd edition, 1880, or 8vo edition, 1890) sought to do for architecture what he had already done for painting. The title and arrangement of the book are characteristic of Ruskin's whole artistic criticism. All work in architecture, and in all else, should be illumined by the lamps of sacrifice, truth, power, beauty, life, memory, and obedience. In 1851 he defended Millais and Holman Hunt, two of the pre-Raphaelite leaders, in letters to the *Times*, and in the same year he followed up this advocacy by a work on *Pre-Raphaelitism*. *The Stones of Venice*, his second masterpiece, began to appear in 1851 (vols. two-three, 1853, complete edition, three vols., 1886, or 8vo edition, 1898). This work, the fruit of much close study and arduous toil, is a worthy companion of *Modern Painters*, and in it, as in the earlier work, we meet the moralist as artist. The chapter *On the Nature of Gothic Architecture*, in which his economic teaching is distinctly foreshadowed, was reprinted by William Morris at the Kelmscott Press in 1892. In 1854 Ruskin came to know D. G. Rossetti, to whom he was a considerate and generous patron, and he was closely associated with F. D. Maurice, Fumivall, and other Christian Socialists in the work of the Working Men's College, where he taught drawing regularly for some seven years. His career as a social reformer may be dated from 1857, when he published a series of lectures on *The Political Economy of Art* (enlarged edition, entitled *A Joy for Ever and its Price in the Market*, 1880, or 8vo edition, 1887). His chief works of this kind are *Unto this Last* (1862, popular edition, 1900), originally written for the *Cornhill Magazine*, *Munera Pulveris* (1872, or 8vo edition, 1886), partly reprinted from *Fraser's Magazine*, *Time and Tide* by Weare and Tyne (1867, or 8vo edition, 1886), and *Fors Clavigera* (1871-84), consisting of letters to the working men and labourers of Great Britain. In these the tendency to exaggeration is clearly manifest, and for a time it stood in the way of the serious consideration of his views. He laid especial stress upon the economic value of healthy, happy, honourable, self-sacrificing life, he directed attention to the vital importance of the problem of distribution and the necessity of economic co-operation, the need for a genuine national system of education, old age pensions, and a radical solution of the housing problem was eloquently set forth by him. In this work Ruskin always professed himself a follower of Carlyle, who was one of his warmest friends and admirers. Some of his books published after 1855 were collections of lectures. Such are *The Two Paths* (1859, or 8vo edition, 1887), *Sesame and Lilies* (1865, enlarged edition, 1871, cheaper edition, 1900), on reading and women, *The Crown of Wild Olive* (1866), lectures on Work, Traffic, War, and *The Future of England* (last not in first edition), and *The Ethics of the Dust* (1866), lessons from crystals. In the year (1867) when he delivered the Rede lecture at Cambridge on *The Relation of National Ethics to National Art* he was awarded the honorary degree of LL.D. by that university, and in 1893 Oxford conferred upon him its D.C.L. degree. In 1871 he was elected lord rector of St. Andrews University.

VOL. XII.

His father's death in 1864 put him in possession of £157,000 and a large amount of property, and enabled him greatly to extend the scope of the philanthropic labours to which he had always been devoted. His large-hearted sympathy led him to befriend to the utmost of his ability all whom he thought deserving of support, but he was especially generous in the assistance of artists and the encouragement of art, and he gave much help to various educational institutions. The period from 1870 till his retirement from active work is full of new schemes of social usefulness, some of them more generous in their conception than practicable in their execution, but all bearing eloquent testimony to the absolute sincerity of his preaching of the gospel of social righteousness and service. In 1871 he founded the Guild of St. George, and himself paid £7000, a tenth of his possessions at that time, into a trust for carrying on its work. The basic principles of the guild were 'that food can only be got out of the ground and happiness out of honesty', and in connection with it he started agricultural settlements, some industrial enterprises, and the St. George's (now Ruskin) Museum at Sheffield. On the death of his mother in 1871 he gave up his house at Denmark Hill and purchased his well-known residence at Brantwood, on the shore of Coniston Lake. In 1870 he was appointed first Slade professor of fine arts at Oxford, and he held this post till 1879, when he resigned owing to illness, and again from 1883 till 1884, when he again resigned because the university endowed vivisection. His lectures at Oxford give the best connected account of his maturer conceptions of art and form the material of the works *Lectures on Art* (1870, or 8vo, 1887), *Aratra Pentelici*, *Six Lectures on the Elements of Sculpture* (1872, or 8vo edition, 1890), *The Eagle's Nest*, *Ten Lectures on the Relation of Natural Science to Art* (1872, or 8vo edition, 1887), *Ariadne Florentina*, *Six Lectures on Wood and Metal Engraving* (1873-76, or 8vo edition, 1878), *Val d'Arno*, *Ten Lectures on the Tuscan Art* directly antecedent to the *Florentine Year of Victories* (1874, or 8vo edition, 1890), *The Art of England* (1884), *The Pleasures of England* (1884), and *Lectures on Landscape* delivered in Lent Term, 1871 (1897). He founded a drawing school at Oxford, and it was during his professorial period that he tried the famous and exceedingly characteristic road digging experiment. In 1878 he experienced the first of several attacks of brain fever, and from this time his excessive work at an unnaturally high pressure caused his health to break down seriously. 1878 was also the year of Whistler's libel action against him, in which the jury awarded one farthing damages. The most notable work of his period of final retirement, broken only by short journeys in search of health, is *Præterita*, *Outlines of Scenes and Thoughts* perhaps worthy of *Memory in my Past Life* (1885-89, new edition, 1886-87, and 1900, the last volume containing *Dialecta*, or selections from his correspondence, &c.). This fragment of autobiography bears little trace of mental decay, but is notable for brilliant description, vivid recollection, and excellent portraiture of men whom he had known. After 1889 he wrote nothing for publication, and on Jan. 20, 1900, he died peacefully at Brantwood. His body is buried in Coniston churchyard.

Of works not above mentioned the following are the most noteworthy: *Frondes Agrestes* (1875), a series of selected readings from *Modern Painters*, *Poems* (1850, privately printed, two vols., 1891, or 8vo edition, 1891), *Examples of the Architecture of Venice* (1851), *Notes on the Construction of Sheepfolds* (1851), on Protestant Christianity, Grotto and

his *Works in Padua* (1854, cr 8vo edition, 1900), *Lectures on Architecture and Painting* (1853, cr 8vo edition, 1891), *Notes on Some of the Principal Pictures exhibited at the Royal Academy* (1855-59 and 1875), *The Harbours of England* (1856, cr 8vo, 1894), with engravings from drawings by Turner, *Catalogue of the Drawings and Sketches of Turner at present exhibited in the National Gallery* (1881, cr 8vo, illustrated, 1899), *The Elements of Drawing* (1857, cr 8vo, 1892), lectures delivered at the Working Men's College: Inaugural Address at the Cambridge School of Art (1858), *The Oxford Museum* (1859, new edition, 1893), with H W Acland, *The Elements of Perspective* (1859), lectures delivered at the Working Men's College, *The Queen of the Air* (1869, cr 8vo, 1887), lectures on the Greek myths of cloud and storm, *Love's Meime Lectures on Greek and English Birds* (1881, cr 8vo, 1897), *Mornings in Florence* (1875-77, collected, 1889), *Proserpina Studies of Wayside Flowers* (1875-86), *Deucalion Collected Studies of the Lapse of Waves and Life of Stones* (1875-83), *A Knight's Faith Passages in the Life of Sir Herbert Edwards* (1885), *Guide to the Principal Pictures at the Academy of Fine Arts, Venice* (1877, new edition, 1891), *St Mark's Rest the History of Venice* (1877-84, collected, 1884), *The Laws of Fésole A Familiar Treatise on the Elementary Principles and Practice of Drawing and Painting* (1877-78), *Notes on the Drawings by Turner exhibited at the Fine Art Society's Galleries* (1878, new edition, 1900), *Letters to the Clergy on the Lord's Prayer and the Church* (1879), *Arrows of the Chace* (1880), a collection of newspaper letters, *Our Fathers have told us, Sketches of the History of Christendom Part 1, The Bible of Amiens* (1880-85), *The Storm Cloud of the Nineteenth Century Two Lectures delivered in the London Institution* (1884), *On the Old Road* (three vols, 1885), a collection of miscellaneous writings, *Hortus Inclusus* (1887), letters to the Misses Mary and Susie Beever, *Three Letters and an Essay*, 1836-41, found in his Tutor's Desk (1893), *Verona and other Lectures* (1894), and *Letters addressed to a College Friend during the Years 1840-45* (1894). In 1871 a collective edition of his works was begun, but it extended to only eleven volumes. Mr E T Cook is supervising a new complete edition of his works. There is a complete bibliography by T J Wise and J P Smart (1893). Ruskin prepared the plates, or at least the drawings, for many of his own works, and he also painted some landscapes, chiefly in water colour. A loan exhibition of his drawings was held in the Royal Water Colour Society's rooms in 1901.

To what has already been said of the work and message of Ruskin little need be added. He was essentially a prophet, on fire with the enthusiasm of humanity, almost fierce in his opposition to every kind of insincerity and injustice. His early religious views were narrow, but in middle life he advanced to a broadly liberal position of no distinctively Christian character, though in later years he added to his religious liberalism a more definitely Christian element. What he said of Modern Painters may be applied to all his work. 'It declares the perfectness and eternal beauty of the work of God, and tests all work of man by concurrence with, or subjection to that.' His teaching has been spread throughout the country by many Ruskin societies, and a Ruskin Hall for working men has been established at Oxford. See Mr Cook's article in the *Dict Nat Biog* (supp vol three, 1901), on which the above is based, W G Collingwood's *Life and Work of John Ruskin* (two vols, 1893), and *Life of John Ruskin* (1900), Mrs. Ritchie's *Records of Tennyson,*

Ruskin, and Browning (1892), Spielmann's *John Ruskin* (1900), Harrison's *Tennyson, Ruskin, Mill, and Others* (1899), W M Rossetti's *Ruskin, Rossetti, and Pre Raphaelitism* (1899), Cook's *Studies in Ruskin* (2nd edition, 1891), Hobson's *John Ruskin, Social Reformer* (1898), Mallock's *New Republic* (1881—Herbert stands for Ruskin), Sizeranne's *Ruskin et la Religion de la Beauté* (1897, Eng trans, 1899), W Smart's *A Disciple of Plato* (1883), Waldstein's *The Work of John Ruskin* (1894), and Mather's *Life and Teaching of John Ruskin* (5th edition, 1898).

RUSSELL, JOHN SCOTT, engineer and naval architect, was the son of a Scotch clergyman, and was born at Glasgow (Parkhead) on May 8, 1808. He received his education at the universities of Edinburgh, St Andrews, and Glasgow, graduating at the latter at the age of sixteen. As he early showed a strong inclination towards practical mechanics his father permitted him to be employed in the workshop of an engineer, and afterwards assisted him to prosecute his studies in cognate sciences. In 1832 he held the temporary appointment of professor of natural philosophy in Edinburgh University. About the same time he began his important researches into the nature of waves, and the resistance which water opposes to the motion of floating bodies. He is credited with the discovery of the existence of the wave of translation on which he founded the wave line system of construction of ships introduced into practice in 1835. For some years he acted as manager of one of the largest ship building and engineering establishments on the Clyde (now Caird and Co at Greenock), but in 1844 he removed to London, and became for many years a well known ship builder on the Thames. The most important vessel he constructed was the *Great Eastern*, the paddle engines and boilers of which were designed and made by him. He became joint-secretary of the Royal Commissioners for carrying out the Great Exhibition of 1851, and took a leading part in organizing it. He was one of the earliest and most active advocates of iron clad men of war, and joint designer of the first English sea going armoured frigate, the *Warrior*. Russell was an active worker in other fields of engineering science. He constructed, for instance, the vast dome of the Vienna Exhibition of 1873, which had the largest clear span (360 feet) of any building in the world. He was one of the founders of the Institution of Naval Architects, and one of its vice presidents till the day of his death, which occurred at Ventnor on the 8th June, 1882. He is the author of a large and costly treatise entitled *The Modern System of Naval Architecture for Commerce and War* (1864-65), of a work on *Systematic Technical Training for the English People* (1869), and *The Wave of Translation in the Ocean of Water, Air, and Ether* (new edition, 1885), besides other works and numerous important papers contributed to various periodicals.

RUSSELL, WILLIAM CLARK, novelist, son of Henry Russell, composer of *Cheer, Boys, Cheer* and other songs, was born in New York on Feb 24, 1844. Educated at Winchester and Boulogne, he was a midshipman in the merchant service from the age of thirteen to that of twenty one. His first sea story, *John Holdsworth, Chief Mate*, appeared in 1874 and was very successful, but he had still greater success with *The Wreck of the Grosvenor* in the following year. Since then he has published a large number of novels, of which the following may be mentioned.—*An Ocean Freelance* (1878), *My Shipmate, Louise* (1882), *A Sea Queen* (1883), *An Ocean Tragedy* (1890), *Alone on a Wide, Wide Sea* (1892), *The Emigrant Ship* (1894), *The Convict*

Ship (1895), *What Cheer!* (1896), *List, ye Lands men!* (1897), *The Two Captains* (1898), *Romance of a Midshipman* (1898), *A Voyage at Anchor* (1899), *The Pretty Polly* (1900), and *The Ship's Adventure* (1901). He has also issued several collections of short stories, and works on Nelson (*Heroes of the Nations*, 1890) and Collingwood (1891). He was for some time connected with the *Newcastle Daily Chronicle* under Joseph Cowen, but for several years, ending in 1887, he was on the staff of the *Daily Telegraph*. One critic thus enumerates his strong and his weak points: 'His real love and knowledge of the sea and all its moods and ways, his capacity for putting his people in strange situations and bringing them through unharmed, his generally healthy and manly tone, and, on the other hand, his defective sense of humour and lack of power to control his extensive and peculiar vocabulary.'

RUSSELL, SIR WILLIAM HOWARD, war correspondent, was born near Dublin on March 28, 1820, and educated at Trinity College, Dublin. He was called to the English bar in 1850. His connection with the *Times* began in 1843, he was war correspondent during the Danish war of 1848, but it was his letters written from the Crimea in 1854-55 that first made him famous. He was present at Alma, Balaklava, Inkerman, and the assaults on Sebastopol, and his letters were the chief means of making public the condition of the army. He was similarly engaged during the Indian Mutiny, the American Secession war, the Prusso-Austrian war,

and the Franco-German war. He accompanied the Prince of Wales to India as honorary private secretary in 1875. His publications comprise *The British Expedition to the Crimea*, *Diary in India*, *My Diary North and South*, *My Diary in the Last Great War*, *Prince of Wales' Tour*, *Doctor Brady, a novel*, and *Hesperotheren, travels in America*. He has received many honours, including many foreign orders, and in 1896 he was knighted.

RUTLAND, a town of the United States, capital of Rutland county, Vermont, 117 miles NNW of Boston. It is an important railway junction, and has valuable white marble quarries in its vicinity. There are also manufactures of machinery, boilers, &c. Pop (1890), 11,760.

RUWENZORI, a group of mountains in Equatorial Africa, discovered by Stanley in 1888, in his great journey from the west to the east coast, when he brought Emin Pasha away with him. It appears to be a chain of heights about 20,000 feet in elevation, and is clad with snow and traversed by large glaciers. It lies about 120 miles to the westward of the Victoria Nyanza, and between the Albert Nyanza and Albert Edward Nyanza, having the river Semliki, which connects the two, on the west. The snow line is about 13,000 feet above sea level. It is sometimes identified with the Mountains of the Moon, spoken of by ancient writers.

RYAZAN See **RIAZAN**.

RYTON, a town of England, in Durham, on the river Tyne, 7 miles west of Newcastle, with collieries, ironworks, &c. Pop (1891), 5553, (1901), 8448.

S.

SAADANI, a seaport of German East Africa, opposite the island of Zanzibar. Pop about 10,000.

SAARGEMUND (French *Sarriguemines*), a garrison town in Alsace, Lorraine, at the junction of the Saar and the Blies. It manufactures silk and silk plushes. Pop (1895), 13,888, (1900), 14,680.

SAAZ, or **SAAF**, a town of Bohemia, on the right bank of the Elbe, which is crossed here by a chain bridge. It is in a fertile district and has an important trade in hops. It is an old town and has a church dating from 1206. Pop (1890), 13,200.

SABA, a small West Indian island, belonging to Holland, and governed as a dependency of Curaçao. It is one of the Leeward Islands, and is in about the same latitude as Barbuda. It consists of a single volcano cone, furrowed by deep, wooded, and fertile valleys, producing sugar, cotton, and indigo. Area, 5 square miles. Pop 2065.

SABANILLA, a seaport of Colombia, serving as the port of Barranquilla. See **BARRANQUILLA**.

SABINE, GENERAL SIR EDWARD, KCB, physicist, was born in Dublin, 14th Oct., 1788. Educated at the Royal Military Colleges of Marlow and Woolwich, he entered the royal artillery in 1803, and served in the campaign against the United States in 1813-14. Physical science, especially in the domain of terrestrial magnetism, began to interest him at a very early period of his career. He accompanied the expeditions of Ross and Parry in search of the North-west Passage, when his magnetic observations gave the first great impulse to the systematic study of the phenomena connected with terrestrial magnetism. In 1821 he commenced a

series of voyages which ranged from the equator to the Arctic Circle, and during which he conducted a great number of pendulum experiments for determining the figure of the earth. The result of these experiments was published in 1825. For many years after this he carried on a vast series of observations in order to verify his theories in terrestrial magnetism and the acceleration of the pendulum in different latitudes. The results were communicated to the Royal Society and to the British Association, to the former of which he contributed no less than forty papers. His discoveries led to the establishment of permanent magnetical and meteorological observatories, those in the colonies being for many years under his guidance. He was elected to the Royal Society in 1818, was vice-president in 1850, and president in 1861, a position which he held for ten years. He was for many a year connected with the British Association, and filled the office of president in 1852. In 1859 he was made lieutenant-general, and he retired from the army with the rank of general in 1874. Among the honours which General Sabine received for his labours were that of KCB in 1869, the Prussian order *Pour le Mérite*, the Copley and the Royal medals of the Royal Society, and the Lalande medal of the Institute of France. He died at Richmond, Surrey, 26th June, 1883, at the age of ninety-five. His wife, who died in 1879, was the translator of Von Wrangell's *Narrative of an Expedition to Siberia* and the *Polar Sea*, 1820-23, an authorized edition—edited by her husband—of Humboldt's *Cosmos*, 1846-58; and Humboldt's *Aspects of Nature*, 1849.

SACCHARIN, a substance prepared from coal-

tar, first introduced to commerce in 1887 by its discoverer, Dr Constantin Fahlberg of Salbke (Germany). Its sweetening properties are enormous, one grain of saccharin is said to sweeten distinctly 70,000 grains of distilled water. It is not a fermentable sugar, and is already in common use in the treatment of disease, as diabetes, for instance, and in many cases in which the palate craves for sweets, but in which ordinary sugar cannot without danger be permitted. Although not a food, there is no doubt that saccharin will, to a certain extent, compete with natural sugars, especially in confectionery and preserving. The French Conseil d'Hygiène et de Salubrité appointed a commission to inquire into the properties of saccharin, and their report, issued in 1888, states that its use in food would seriously affect the digestive functions, and recommends the government to prohibit its employment in alimentary substances. The discoverer and many eminent chemists, Continental and British, deny that saccharin is injurious to the human system, and it is also asserted that the hostility to the new sweetening substance emanates from those interested in the French sugar industry. It is largely in use in Germany in the manufacture of confectionery, in brewing, &c.

SADDLEWORTH, an urban district of England, in Yorkshire (West Riding), 5 miles east by north of Oldham, on the Manchester and Huddersfield Canal, with cotton and woollen manufactures, &c. Pop (1891), 13,477, (1901), 12,319.

SAFE, a receptacle for money, important papers, and valuables, usually of iron or steel, or of both combined. A safe to answer all requirements should be proof against fire, explosives, acids, drills, wedges, and the other implements and opening devices resorted to by burglars. A fire proof safe need only be so constructed that, although exposed to the intense heat of a conflagration, its inner recesses remain at a sufficiently low temperature to prevent combustion of the contents. A burglar proof safe needs many other safeguards, and the history of safe making is mainly a record of struggles between the burglar and the safe manufacturer, the result is, that safes can now be obtained which are all but impregnable. The safe consists of an outer and an inner wall, the space between being filled with some fireproof material, such as asbestos, silicate cotton, gypsum, &c. Alum and other substances yielding a large proportion of water when decomposed by heat have obvious advantages as safe linings, and there are safes with vessels of glass containing water between the walls, these vessels being intended to break and the water to be converted into steam when the safe is exposed to fire. (See **FIRE PROOFING**.) The outside casing, which may be single or compound, naturally receives the greatest attention, and various are the devices of manufacturers to render it sufficiently hard and solid to resist the finely tempered drills of the burglar. To prevent wrenching, the door is secured by bolts moving straight or diagonally into slots on one or on all sides. These bolts are moved by the door handle, and the lock key fixes them in their positions. With the modern safe of the best kind the lock may be said to be the only vulnerable point, hence much care and ingenuity have been expended on its mechanism. The first great improvements in locks, as applied to safes, were due to Chubb of London, a name which still stands in the front rank of safe lock makers, but numerous patents, mostly of American origin, have been introduced in recent years. Of these, the keyless permutation locks deserve particular mention, as they obviate the danger which arises from lost or false keys. Such locks

allow of opening only after an indicator has been moved in accordance with a certain combination of numbers arranged before closing the safe. Some safe-locks are so constructed that to be freed they require different keys on different days, some can only be opened at a certain hour, thus being fixed on before the door is closed, whilst others again require two or more keys in charge of different persons, in fact, the arrangements contrived to render the plundering of safes next to impossible are too numerous even to mention. The connection of safes with electric alarms in a variety of ways forms another safeguard. An interesting form of safe is the Corliss spherical revolving safe, composed of an inner and an outer shell, of which the former revolves within the latter. The inner shell forms both the door and the receptacle for containing the valuables.

SAINTE CROIX See **CRUZ (SANTA)**

SAINTE MARIE See **NOSSIBRAHIM** in **SUPP**

SAINT HYACINTHE, a city of Canada, province of Quebec, on the Grand Trunk Railway and the Yamaska and Black rivers, 35 miles ENE of Montreal. It is a thriving place, and contains a Roman Catholic cathedral, seminary, bishop's palace, &c. Pop (1891), 7016, (1901), 9210.

ST JOHN, the chief town of the British West Indian island of Antigua, on the north west coast. A large part of the town was once destroyed by an earthquake. The exports are chiefly sugar and pine-apples. Pop (1901), 9262.

ST JOHN'S WORT (*Hypericum*), a genus of plants belonging to the natural order Hypericaceæ. Numerous species are to be found in various parts of the temperate zone, mostly as small showy shrubs. Yellow is the predominating colour of the flowers, which are five petalled, and the stamens are numerous and united by their filaments into three or five bundles. The leaves and blossoms, when rubbed between the fingers, emit a strong, resinous aromatic odour and have a bitter taste, due to a volatile oil, possessing astringent and tonic properties, and which held a prominent place in the old pharmacopœias. *H. perforatum*, to which formerly the name of St John's wort was limited, has its leaves marked with pellucid dots, giving them a perforated appearance. *H. calycinum*, popularly called Aaron's beard, is a shrubby plant with handsome flowers, often planted in shrubberies, &c. Its leaves are also dotted. Both these species are found wild in Britain, though the latter occurs but rarely. Other British species are the Tutsan (*H. Androsceum*), a large flowered kind, and *H. elodes*, a smaller bog species. The total number of British forms is about twelve.

SAINT KITT'S See **CHRISTOPHER'S (ST)**

SAINT MARY'S RIVER, the channel connecting Lake Superior with Lake Huron, having more the character of a lake than a river. At Sault Ste Marie, or St Mary's Falls, there is a fall of 22 feet, and to enable vessels to avoid this canal has been made both in the United States and in Canada. The Canadian canal is the larger and more recent, and was completed in the latter part of 1895.

ST MICHAEL See **AZORES**

SAINT OÜEN, a town of France, in the department of the Seine, about 2 miles south-west of St Denis. It has important manufactures, and is a busy river port, with large docks. Pop (1896), 30,715, (1901), 35,351.

ST PAUL, a small volcanic island in the Indian Ocean, in about 88° 43' south lat., and 77° 31' east long. It is some 40 miles from New Amsterdam, with which it was ceded by Britain to France in 1892.

SAINTSBURY, **GEORGE EDWARD BATEMAN**,

English literary critic, was born at Southampton on Oct. 23, 1845, and educated at King's College School, London, and Merton College, Oxford. After about a year as assistant master in Manchester Grammar School, he was appointed senior classical master in Elizabeth College, Guernsey, in 1868, holding that office till 1874, when he went to Elgin as headmaster of the Educational Institute. Two years afterwards he embarked on journalistic and literary work in London, and in 1895 he was appointed to the chair of Rhetoric and English Literature in Edinburgh University. He has published a large number of books, chiefly on the literature of England and of France, of which the following may be mentioned: *Primer of French Literature* (1880), *Dryden (Men of Letters Series, 1881)*, *Short History of French Literature* (1882), *Specimens of French Literature from Villon to Hugo* (1883), *Marlborough (English Worthies, 1885)*, *Specimens of English Prose Style from Malory to Macaulay* (1885), *Manchester* (1887), *History of Elizabethan Literature* (1887), *Essays in English Literature 1780-1860* (1891), *Essays on French Novelists* (1891), *Miscellaneous Essays* (1892), *The Earl of Derby (Queen's Prime Ministers, 1892)*, *Corrected Impressions* (1895), *Nineteenth Century Literature* (1896), *The Flourishing of Romance and the Rise of Allegory* (1897), *Sir Walter Scott* (1897), *A Short History of English Literature* (1898), *Matthew Arnold* (1899), *A History of Criticism* (vol. 1, 1900), and *The Earlier Renaissance* (1901). Besides these he has edited *Political Pamphlets*, *A Calendar of Verse*, *Tales of Mystery*, various classics, &c.

ST THOMAS, a thriving town of Canada, in the province of Ontario, 9 miles north of Lake Erie and 15 south of London, with various industries and an active trade. It is an important railway centre. Pop (1891), 10,366, (1901), 11,485.

SAKAI, a town of Japan, on the north west coast of Hondo, some 90 miles north by east of Kioto. Pop (1899), 50,203.

SALDANHA BAY, a bay of the Atlantic, on the west coast of Cape Colony, South Africa, 80 miles north of Cape Town. It is the finest natural harbour in the colony, with excellent shelter and anchorage at all seasons, but is at present little frequented on account of scarcity of water and fuel. It was formerly the chief Dutch naval station in South Africa.

SALICINE, a drug derived from the bark of the willow. It is contained also in poplar bark and in the buds of the meadow sweet, and is employed in medicine for the purpose of reducing fever, and in the treatment of rheumatic fever. It is also very useful for neuralgia and neuralgic headaches, especially when combined with 5 grains of quinine.

SALISBURY, the capital of Southern Rhodesia, in Mashonaland, near Mount Hampden. It is 380 miles from Beira on the east coast, 272 from Bulawayo, and 1633 from Cape Town, and is now in railway communication with each of these places. It is in two parts, the Causeway and the Kopje, separated by a space some three quarters of a mile broad. The former portion contains the government buildings and the private houses, while the latter includes the business part of the town. It has a cathedral and several churches, four hotels, a hospital, court-house, jail, stock exchange, and other buildings. In the neighbourhood gold and coal are found. Pop., 500 whites.

SALISBURY, ROBERT ARTHUR TALBOT GASCOYNE CECIL, THIRD MARQUIS OF, English statesman, second and eldest surviving son of the second Marquis of Salisbury by his first wife, the heiress of

Bamber Gascoyne, was born at the family seat of Hatfield on Feb. 3, 1830. He is descended from Elizabeth's minister, William Cecil, Lord Burleigh, but the marquise dates from 1789. He was educated at Eton and Christ Church, Oxford, where he took the degree of B.A. and became a fellow of All Souls' in 1853. In the latter year he was elected (as Lord Robert Cecil) to the House of Commons as member for the family borough of Stamford, and he represented that place as a Conservative until 1868, when he succeeded his father in the peerage. In 1866 he was appointed Secretary for India in Lord Derby's ministry, but when Disraeli introduced his reform bill in the following year Viscount Cranborne (as his courtesy title then was) resigned along with Lord Carnarvon and General Peel. He was once more placed at the head of the India Office in 1874, when Disraeli formed his ministry, and, as special ambassador, took a leading part in the negotiations on the Eastern Question. In April, 1878, he was transferred to the Foreign Office, and along with the Earl of Beaconsfield he represented Britain at the important Congress of Berlin later in the same year. For his services there he was created a knight of the Garter and received the freedom of the City of London. He went out of office with his colleagues after the great Conservative *débâcle* of 1880, and on the death of Beaconsfield in the following year he became leader of the opposition in the upper house. He at first opposed the Irish Land Act of 1881, and he vigorously denounced the government's conduct in Egypt. After opposing the Franchise Bill of 1884, he took part in the conference of party leaders which framed the two great reform bills soon afterwards passed. When Mr Gladstone was defeated on a Budget resolution in June, 1885, Lord Salisbury formed his first ministry, in which he himself took the office of foreign secretary. The general election of 1885 led to the defeat of the Conservative ministry on the address in January, 1886, and Mr Gladstone returned to power. Lord Salisbury offered strong opposition to Mr Gladstone's Home Rule Bill, and after the Liberal reverse at the polls in 1886 he again became prime minister and (after a cabinet reconstruction) foreign secretary. This, his second, administration remained in office till 1892, during which time such important measures as the Local Government Act, the London County Council Act, and the introduction of free elementary education were passed into law. In 1888 he introduced into the House of Lords a bill for the reform of that body by the creation of life peers. When the Liberal government under Lord Rosebery suffered defeat and went out of office in 1895, Lord Salisbury again formed a ministry, and at the general election of that year his party received an immense majority in the House of Commons. He again assumed the responsibilities of the foreign office, and had to deal with the Venezuelan boundary question and the attitude of the United States in regard to it, and also with the Armenian and the Cretan questions. The China question also became acute during 1897. The new Egyptian campaigns, the Fashoda incident, and above all the South African War of 1899-1902, are other important events of Lord Salisbury's third term of office (see BRITAIN). In 1900 he appealed to the country on the South African policy of the government, and his party was returned with a large majority. After the election the cabinet was reconstructed, and Lord Salisbury gave up the foreign secretaryship and became Lord Privy Seal. In 1902 he retired from his public offices, being succeeded as premier by his nephew, Mr A. J. Balfour. He has been High Steward of Westminster since

1900, Lord Warden of the Cinque Ports and Constable of Dover Castle in 1895-1900, High Steward of Great Yarmouth since 1888, Elder Brother of Trinity House since 1886, and chancellor of the University of Oxford since 1869. In 1894 he was appointed an honorary student of Christ Church, Oxford. Lord Salisbury has always taken a great interest in science, and in 1894 he presided over the meeting of the British Association at Oxford. He lost his wife, a daughter of Sir Edward Hall Alderson, in 1899. His eldest son and heir, Viscount Cranborne, born in 1861, has represented Rochester as a Conservative in the House of Commons since 1893, and became under secretary for foreign affairs in 1900. His youngest son, Lord Hugh Richard Heathcote Cecil (born 1869), has been member of parliament for Greenwich since 1895, being well known as an eloquent and earnest defender of the interests of the Church of England.

SALTAIRE, a town of England, in Yorkshire (West Riding), on the river Aire, 4 miles north west of Bradford. It is a model town, with well planned streets, and is named after its founder, Sir Titus Salt, who planted here his vast factories for the manufacture of alpaca, and built dwellings for his employes. The town contains several fine buildings, including a Congregational church, a Wesleyan church, an institute with gymnasium, library, &c., and schools. There is also a fine public park, presented by the founder in 1871. The number of employes is about 3500.

SALT RANGE, a hill system of India, in the Jehlam, Shahpur, and Bunno districts of the Punjab, deriving its name from its extensive deposits of rock salt, greatest height, 5010 feet.

SALWATTI. See SALAWATTY in SUPP.

SALWIN, **SALWEEN**, or **SALWEN**, a river of Burmah, with a general north and south course, parallel to the Irrawaddy, rising in South western China, and falling into the Indian Ocean (Gulf of Martaban), the towns of Martaban, Moulmein, and Amherst being at or near its mouth. The river course is interrupted by rocks and rapids, but vessels of the largest size can reach Moulmein. Vast quantities of teak are annually floated down the Salwin and shipped at Moulmein for export.

SALZBRUNN, a town of Prussian Silesia, 43 miles by railway from Breslau, 1270 feet above the sea, with saline mineral springs, which cause a considerable influx of visitors from May to October. The waters are cold, are used both for bathing and drinking, and are recommended for gravel and gout. Glass and porcelain are manufactured in the town. Pop. (1895), 7332.

SAMARANG, a town of Java, on the north coast of the island, near the mouth of the Sumarang river. Next to Batavia and Surabaya it ranks as the most important commercial port of Java. Its harbour is not good, and large ships have to anchor at some distance from the shore. The chief exports are sugar, coffee, and indigo. Pop. in 1897, 84,266, of whom 3355 were Europeans and 11,870 Chinese.

SAMBOR, a town of Austria, in Galicia, on the Dniester, fully 40 miles to the south west of Lemberg. It has salt and damask works, and is connected by rail with Lemberg, Premysl, and the chief towns of Austria. Pop. (1890), 13,586.

SAMBRE, a river of N E France and Belgium, a tributary of the Meuse, which it enters at Namur. It rises in the French department of the Aisne, and also waters that of the Nord, having a length of 110 miles. It is navigable to Landrecies, whence a canal proceeds to Fère on the river Oise.

SAMSÖ, a small island belonging to Denmark, situated in the Kattegat, between Seeland and Jut-

land. The soil is very fertile. The chief place is the large village of Nordby. Pop. 6599.

SANATORIUM, a place to which people resort for the sake of their health, the term being specifically applied to military or civil stations on the mountains or table lands of tropical countries, with climates suited to the health of Europeans. There are many military and other sanatoria in British India. Recently a movement has been set on foot for the equipment of open air sanatoria for consumptive patients.

SAN CRISTOBAL, a town of Mexico, capital of the state of Chiapas, 450 miles E S E of the city of Mexico. Its manufactures earthenware and coarse textiles, but the chief occupation is cattle raising. Pop. about 12,000.

SAND, GEORGE. See DUDEVANT.

SANDAKAN, the capital of British North Borneo, on the north east coast of the island. It stands on the northern shore of a bay of the same name, and has an excellent land locked harbour which admits the largest vessels. The town was formerly known as *Elopua*. Pop. (1891), 6350, of whom about half are Chinese, only 114 being British.

SANDAY, WILLIAM, Anglican divine, was born at Holme Pierrepont, Nottingham, on Aug. 1, 1843. He received his earlier education at Repton school, and from it he passed first to Balliol, and afterwards to Corpus Christi College, Oxford. He took a first in classics in 1865, and graduated M.A. in 1868. He was a fellow of Trinity College in 1866-73. He was ordained deacon in 1867, priest in 1869, in 1871 he was appointed lecturer of St Nicholas, Abingdon, and in 1872 he was presented to the vicarage of Great Waltham, Chelmsford. He became rector of Barton on the Heath, Shipston on Stour, in 1873, and from 1876 till 1883 he was principal of Bishop Hatfield's Hall, Durham. During the twelve years 1883-95 he was Dean Ireland's professor of exegesis at Oxford, and a tutorial fellow of Exeter College, and since 1895 he has been Lady Margaret professor of divinity in the same university and a canon of Christ Church. He has been examining chaplain to the Bishop of Durham (1879-81), Whitehall preacher (1889-90), and Select Preacher in Cambridge University (1880-92). In his attitude towards the modern criticism of Christianity and the Bible Professor Sanday occupies a mediating position, with a bias in favour of conservative views. His earliest published work was *The Authorship and Historical Character of the Fourth Gospel*, considered in reference to the contents of the Gospel itself, a Critical Essay (1872), which was followed by *The Gospels in The Second Century* (1876), a reply to *Supernatural Religion*. A much abler and more important work is his *The Oracles of God* (1891), comprising lectures on inspiration and an estimate of modern Biblical criticism. Inspiration was also the subject of his Bampton lectures of 1893. His other publications include *Two Present Day Questions* (1892), treating of criticism and of the social movement, *The Catholic Movement and the Archbishops' Decision* (1899), articles in *Hastings' Dictionary of the Bible*, commentaries on *Romans* and *Galatians*, in *Ellicott's Commentary* (1878), a commentary on *Romans* (1895), &c. He is also joint-editor of the *Variorum Bible*, and (with the Bishop of Salisbury) of *Old Latin Biblical Texts* (1886).

SAN DIEGO, a rapidly rising seaport of Southern California, U.S., capital of San Diego county, and situated on a fine bay of the same name. The bay was discovered in 1542, and the first settlement founded in 1769, the present city, however, dates only from 1867. The excellence of the climate has

made it a favourite resort for invalids. The country produces large quantities of honey, and fruit-culture is extensively carried on. There are also flour mills, saw works, planing mills, &c. Pop (1890), 16,159.

SANFORD, city of Orange county, Florida, on the south side of Lake Monroe, an expansion of the St John River, 125 miles south of Jacksonville. It is a rapidly increasing place and important railway centre. Oranges and vegetables are shipped in large quantities. Pop (1890), 2016.

SAN JOAQUIN, a river of California which rises in Mount Lyell on the east slopes of the Sierra Nevada, flows south west for about 100 miles, then turns north-west and traverses the valley of the same name from the Tulare Lakes, joins the Sacramento, and falls into Suisun Bay. It has a length of 350 miles, of which about 100 are navigable.

SAN JUAN, a river of Nicaragua, Central America, forming the outlet of the Nicaragua Lake into the Caribbean Sea. Its length is about 100 miles, and in its lower course it divides into several branches, of which the chief is the Colorado. At its mouth stands San Juan del Norte or Greytown. See NICARAGUA.

SAN MIGUEL, a town of Mexico, state of Guanajuato, on the Rio de la Lara, with manufactures of woollens, saddles, weapons, &c. Pop 39,290.

SANTAL PARGANAS, **THE**, a district in the Bhagalpur division of Bengal, area, 5456 sq miles. The Ganges, which bounds the district on the north and partly on the east, forms also its chief drainage. Various minerals, as coal, iron, and silver, have been found in this district. Pop (1891), 1,754,196. The capital is Dumka. The district is named from the Santals, who form the most characteristic portion of its inhabitants, and are also found elsewhere in India. They are one of the aboriginal races belonging to the Dravidian stock, are dark coloured, and mostly profess a religion of their own, in which the worship of a chief deity and subordinate deities and a sort of ancestor worship play a chief part. They live chiefly by hunting, and are exceedingly fond of flute playing, dancing, and singing.

SANTAL WOOD, a dye wood obtained from *Pterocarpus santalinus*, a leguminous tree of the East Indies, Madagascar, &c., also called sanders or saunders wood and red sandal wood. *Santaline*, a substance obtained from it, is used in dyeing blue and brown.

SANTA MARTA, a town of Colombia, South America, on the north coast, a few miles north by east of the mouth of the Magdalena. It is the capital of the department of Magdalena, and stands in a beautiful but rather unhealthy region. Pop 6000.

SANTIAGO DEL ESTERO, a town of the Argentine Republic, in the province of the same name, in a fertile district on the Rio Dulce. Pop 10,000.—The province has an area of 31,500 square miles, and is well suited for cattle-rearing and agriculture. Pop (1900), 180,612.

SANTIPUR, a town in Nadiya district, Bengal, on the river Hooghly, about 45 miles to the north of Calcutta. It is well known for its cloth manufactures, has an annual fair which lasts for three days, and a considerable local trade. Pop (1891), 30,437.

SANTO DOMINGO. See SAN DOMINGO and DOMINICAN REPUBLIC.

SANTONIN, **SANTONINE** ($C_{15}H_{15}O_5$), a proximate principle, possessing acid properties, obtained from the seed of a species of southernwood. It is colourless, crystallizable, and soluble in alcohol, and in the fixed and volatile oils, and is one of the most effi-

cacious vermifuges. It will act, however, only on round worms.

SAPODILLA, a tree of the genus *Achras*, the *A. Sapota*, belonging to the natural order Sapotaceæ, and found in the West Indies. The fruit resembles a bergamot pear in shape and size. It is often called *naseberry*, and is much prized as an article of diet. The bark of the sapodilla is used in medicine as an astringent, and the seeds as a diuretic.

SARDHANA, a town in the Meerut district of the North West Provinces of India, about 12 miles N.W. of Meerut. It was the former capital of the Begam Samru, and contains the Begam's residence, a Roman Catholic cathedral, four Jain temples, the ruins of an old fort, and other edifices. Pop (1891), 13,313.

SARDOU, **VICTORIEN**, French dramatist, son of a schoolmaster, was born at Paris on Sept. 7, 1831. He studied medicine and was for a time a tutor in philosophy, mathematics, and history, but he soon began his literary career by writing for reviews and encyclopædias. His first play, *La Taverne des Étudiants*, failed at the Odéon in 1854, and for a time he abandoned the theatre, but on making the acquaintance of Mme. Dejazet he began again to write for the stage. Since then his success has been great and constantly growing, and he has become well known outside of his native country. His plays are very numerous, but there are few, if any, real tragedies amongst them. The following may be mentioned as the most important: *Les Pattes de Mouche* (1869), *Les Prés Saint Gervais* (1862), *Nos Intimes* (1862), *Les Vieux Garçons* (1865), *Seraphine* (1868), *Patrie* (1869), a historical drama, *Le Roi Carotte* (1872), an *opéra bouffe*, act by Offenbach, *Rabagas* (1872), *L'Oncle Sam* (1873), *Ferret* (1875), *Dora* (1877), *Les Bourgeois de Pont d'Arcy* (1878), *Daniel Rochat* (1880), *Divorçons* (1880), *Odette* (1881), *Fedora* (1882), *Théodora* (1884), *La Tosca* (1887), *Cléopâtre* (1889), *Thermidor* (1891), in which he attacked the French revolution and so provoked much opposition, *Madame Sans Gêne* (1893), *Gismonda* (1894), *Marcelle* (1896), *Spiritisme* (1897), and *Pamela*, *Marchande de Fricotiers* (1898). Several of these plays, from *Fedora* onwards, were specially written for the actress Sarah Bernhardt (which see in SUPP.). He has also written the novels *La Perle Noire* (1862), *La Terreur*, and *Carlin*, the two last still unpublished, besides a few other works. In 1877 he was admitted a member of the French Academy.

SASINE, in Scots law, a term used to signify either the act of giving legal possession of feudal property (in which case it is synonymous with *infestment*), or the instrument by which the fact is proved. There is a general office for the registering of sasines in Edinburgh. See INFESTMENT in SUPP.

SASKATCHEWAN, a river of Canada, rises in the Rocky Mountains near lon 115° W. It is formed by the junction of two main branches, called respectively the North and South Saskatchewan, which flow generally east to their junction, about 150 miles north-west of the north-west angle of Manitoba, whence the river takes a curve north-east and south-east, and passing through Cedar Lake empties itself into Lake Winnipeg, after a course of about 1300 miles measuring along the South Branch, some 70 less measuring along the North. It flows through a region yielding coal, salt, iron, gold, &c., and now attracting numerous settlers. From the South Branch of this great river north-west to Peace River the climate is adapted to the growth of wheat, and the valley of the river is said to be fitted to sustain as dense an agricultural population as any area of equal extent on the face of the globe. The main

stream and its branches afford about 1000 miles of navigable waterway, and steamers now ply on it. The river gives name to a district and future province in the North-West Territories of Canada, bounded on the south by Assiniboa, east by Lake Winnipeg and Nelson River, north by the 55th parallel, and west by Alberta, area, 107,092 square miles, pop. (1891), 11,150, (1901), 25,679. The capital is Battleford, the other chief town being Prince Albert.

SAURY-PIKE, a fish of the genus *Scomberesox*, family Scomberesocidae, and order Pharyngognathi, having a greatly-elongated body covered with minute scales. The jaws are prolonged into a long sharp beak. One species (*S. saurus*), about 15 inches long, occurs plentifully on the British coasts, frequenting firths in shoals so dense that it may be taken in pailfuls. In order to escape the pursuit of the porpoise and large fishes it often leaps out of the water or skims rapidly along the surface, whence it has obtained the name of *skipper*. See **PIKE**.

SAVAGE ISLAND, or **NIUE**, a small upraised coral island in the Pacific Ocean, situated between the Samoan and Tonga groups in about long 170° w. It is about 9 miles long and very fertile, and is inhabited by a mixed Samoan and Melanesian population, who have all been christianized. They are a gentle and intelligent people, and speak a Samoan dialect. Pop. over 5000.

SAVAII, the largest of the Samoan islands, belonging to Germany, about 40 miles long, and having an area of about 657 square miles. It is mostly sterile, being covered with the products of recent volcanic action. There are many extinct craters, some of which, as that of Mua, reach a great elevation. Pop. 12,500.

SAXON ARCHITECTURE, the earliest stage of native English architecture, its period being from the conversion of England to Christianity till the Conquest or near it, when Norman architecture began to prevail (7th to 11th century). The few relics left us of this style exhibit its general characteristics as having been rude solidity and strength. The walls are of rough masonry, very thick, without buttresses, and sometimes of herring bone work, the towers and pillars thick in proportion to height, the former being sometimes not more than three diameters high, the quoins or angle masonry are of hewn stones set alternately on end and horizontally ('long and-short' work), the arches of doorways and windows are rounded, or sometimes these openings have triangular heads, their jambs of long and short work carrying either rudely carved impostors or capitals with square abaci. Sometimes heavy mouldings run round the arches, and when two or more arches are conjoined in an arcade these are on heavy low shafts formed like balusters. Window openings are often splayed both from the inside and from the outside, and the windows themselves are small. On the outside of towers, walls, &c., there are often found slightly projecting pilaster like shafts, usually formed of the long and short work characteristic of the quoins. There is still some doubt as to how far Saxon work in stone has survived, but it seems fairly probable that in a few cases we have real specimens of pre Norman work completed or altered, it may be, in accordance with Norman ideas.

SAYCE, **ARCHIBALD HENRY**, Assyriologist and biblical critic, son of an Anglican clergyman, was born at Shirehampton, near Bristol, on Sept. 25, 1846. He received his earlier education privately and at Grosvenor College, Bath, and in 1865 he became a scholar of Queen's College, Oxford. He graduated with a first in classics in 1868, was elected a fellow of his college in the following year, and became a

tutor in 1870. He took deacon's orders in 1870 and priest's in the following year, and in 1876 he was appointed deputy professor of comparative philology at Oxford. Since 1891 he has occupied the chair of Assyriology in the same university. He was a member of the Old Testament Revision Company, Hibbert lecturer in 1887, and Gifford lecturer at Edinburgh in 1900-01. In 1881 he received the honorary degree of LL.D. from Dublin, and in 1889 the honorary degree of D.D. from Edinburgh. Professor Sayce is an eminent authority on Assyriology, in which he has done much valuable original work. In regard to the date and authorship of the Old Testament books he stands between the higher critics and the extreme orthodox party. On such books as Daniel, Esther, and Chronicles he is as 'high' as any other critic, and even on the Pentateuch, where he in the main seeks to defend the Mosaic authorship, he admits composite authorship and non historicity to some extent. His larger and more important works are: *An Assyrian Grammar for Comparative Purposes* (1872), *The Principles of Comparative Philology* (1874), *The Astronomy and Astrology of the Babylonians* (1874), *An Elementary Assyrian Grammar and Reading Book* (1875), *Lectures on the Assyrian Syllabary and Grammar* (1877), *Lectures on Babylonian Literature* (1877), *Introduction to the Science of Language* (1880), *The Vannic Inscriptions Deciphered and Translated* (1882), *The Ancient Empires of the East* (1884), *Introduction to Ezra, Nehemiah, and Esther* (1885), *The Inscriptions of Mal Amir* (1885), *The Origin and Growth of Religion as illustrated by the Religion of the Ancient Babylonians* (1887), his Hibbert lectures, *Life and Times of Isaiah* (1889), *The Higher Criticism and the Verdict of the Monuments* (1894), *Early History of the Hebrews* (1897), and *Babylonians and Assyrians* (1900). He has also written the following popular works: *The Monuments of the Hittites* (1881), *Assyria: its Princes, Priests, and People* (1882), *Fresh Light from the Ancient Monuments* (1884), *The Hittites* (1889), *The Races of the Old Testament* (1891), *Social Life among the Assyrians and Babylonians* (1893), *Patriarchal Palestine* (1895), *The Egypt of the Hebrews and Herodotos* (1895), and *Israel and the Surrounding Nations* (1898). He contributed translations to the first series of *Records of the Past*, and he edited the second series (1889), and he has also edited works by George Smith and others.

SCALE FERN, a popular name for a fern of the genus *Ceterach* (*C. officinarum*), belonging to the sub family Aspleniceæ of Polypodiaceæ, and so named from the imbricated tawny scales at the back of the fronds. These scales serve to distinguish it at once from every other British fern. It is found in chalk districts in some parts of England.

SCALE MOSS, a popular name given to the Jungermannias, plants resembling mosses, and belonging to the order Hepaticæ. See **LIVERWORTS**.

SCHAFF, **PHILIP**, D.D., biblical scholar, was born at Coire, Switzerland, on Jan. 1, 1819. He studied at Tübingen, Halle, and Berlin, and after travelling through several of the countries of Europe as tutor to a nobleman, became a lecturer in the latter university in 1842-44. He then went to America, where he was professor in the theological seminary of the German Reformed Church at Mercersburg (Pa.) from 1844 to 1863. In 1864-69 he was lecturer in several theological institutions, and in 1870 he became professor of Sacred Literature in Union Theological Seminary, New York. This post he held till his transference in 1887 to the chair of Church History in the same college. He died in New York on Oct. 20, 1893. He was a prolific

writer, his works including *History of the Apostolic Church* (1853), *History of the Christian Church* (1867, new and enlarged edition, seven vols., 1889-92), *Credo of Christendom* (1876), *Religious Encyclopedia* (as editor), &c.

SCHANDAU, a favourite summer resort in Saxon Switzerland, on the right bank of the Elbe, 21 miles s.e. of Dresden. Near it there are sandstone quarries. Pop (1895), 3089.

SCHARF, SIR GEORGE, artist, was born in London on Dec. 16, 1820, his father being George Scharf, a Bavarian artist who had settled in England. Educated at University College School, he studied art under his father, and in 1838, after gaining medals from the Society of Arts, entered the Royal Academy schools. In 1840 he visited Asia Minor with Sir Charles Fellows, and again in 1843 as draughtsman to a government expedition. On his return he devoted himself to painting in oil and to book illustration, among the books illustrated by him being Murray's *Prayer Book*, Macaulay's *Lays*, Milman's *Horace*, Kugler's *Handbook of Italian Painting*, Layard's books on Nineveh, Keats' *Poems*, and Sir W. Smith's *Classical Dictionaries*. His extensive knowledge of art and archaeology enabled him to render valuable assistance to the Crystal Palace authorities in planning the Greek, Roman, and Pompeian courts, and to Charles Kean in his Shakspeare revivals of 1851-57. He was art secretary to the Manchester exhibition of 1857, and on the foundation of the National Portrait Gallery in that year he became its first secretary. From this time onwards he made a special study of portraits, a subject on which he soon became a recognized authority, and in 1882 he received the title of director of the gallery. Three years later he was made a companion of the Bath. In 1895 he was compelled to resign his post owing to the state of his health, whereupon he was created K.C.B., but some weeks later, on April 19, he died at his house in Westminster. His publications comprise *Recollections of Scenic Effects* (1839), a series of etchings illustrating Macready's Shakspearian and classical revivals, the part on sculpture in Waring's *Art Treasures of the United Kingdom* (1857), many papers in the proceedings of the Society of Antiquaries, of which he became a fellow in 1852, &c. To Scharf's great knowledge and industry the National Portrait Gallery owes almost its whole value.

SCHÉELE'S GREEN, a grass green pigment consisting of a pulverulent arsenite of copper first prepared by *Scheele*. It is used both in oil- and water colour painting, but in calico printing and wall paper manufacture it has been largely superseded.

SCHERER, EDMOND HENRI ADOLPHE, French critic, was born in Paris in 1815, and died at Versailles on Mar. 16, 1889. He received his education at the Collège Bourbon and afterwards spent two years in England. Returning to the Continent he studied theology at Strasburg, and in 1843 became professor of exegesis at Geneva, a post which he resigned in 1850, and henceforward was a leading spirit in the liberal movement in Protestant theology. During his stay at Geneva he edited *La Réformation au XIX^e Siècle*. He was elected to the Assembly in 1871, and four years after became a senator, but it is as a critic of the literature of the eighteenth and nineteenth centuries that he excelled. He contributed largely to the *Temps*, the *London Daily News*, &c., and his collected studies have given him the position of literary successor to Sainte-Beuve. His *Essays on English Literature* were translated, with critical introduction, by Prof. Saintsbury (1891).

SCHILLING, JOHANN, German sculptor, was born at Mittweida, Saxony, on June 23, 1828, and studied art at Berlin and Dresden. A travelling scholarship which he gained enabled him to visit Italy. In 1868 he became professor at the Dresden Royal Academy. His chief works include the *Four Seasons* at Dresden, Schiller's statue at Vienna, Maximilian's statue at Trieste, War Memorial at Hamburg, and the German National Monument on the Niederwald, opposite Bingen on the Rhine, with a colossal figure of Germania.

SCHÖNINGEN, a town of Germany, in Brunswick, 20 miles s.e. of Brunswick, with a salt work, chemical works, &c. Pop (1895), 8115.

SCHOOLS (*Continuation*)

New South Wales.—When the first settlement was founded in Australia, the instructions issued to Governor Phillip directed that 200 acres near every township should be reserved for the maintenance of a schoolmaster, but this was not carried out. The Society for the Propagation of the Gospel was the first to move in the matter of education. It made, at the request of the first chaplain to the colony, Rev. R. Johnson, a grant of £40—£10 for each of four educated convicts who were to act as teachers. This was in 1792. From 1810 onwards schools were established by the churches, aided by state grants. A board of education, consisting of one representative from each of the following churches, Church of England, Roman Catholic, Presbyterian, and Wesleyan, was appointed to distribute the sums voted for denominational schools. In 1840 there was incorporated a board of national education. After this there existed a keen rivalry between the schools—both supported by state grants—under these two boards. They competed for the same pupils, the progress of one often meant the decay of the other, there was constant friction and jealousy between them, and consequently unnecessary waste of money and effort. In 1867 an act was passed which established one authority called 'the council of education', with power to make regulations for the control of public education. This act recognized four classes of schools—(i) public schools, in localities where 25 children would regularly attend, which were, as a rule, to take precedence of all other schools, (ii) denominational schools, (iii) provisional schools, in places where 25 children could not be secured, and (iv) half time schools, at which about 10 or 12 pupils attended, and for which one teacher divided his time between two. The local oversight of schools was provided for by the appointment of boards of not less than three members. These were appointed by the governor on the recommendation of the Council of Education. In 1880 was passed the 'public instruction act', which provided—(i) that primary school education should be under the sole direction and control of a responsible minister, (ii) that teachers should be civil servants, and paid wholly from the public funds, (iii) all schools should be undenominational, (iv) attendance at school for 140 days in a year should be obligatory upon all children between 6 and 14 years of age, and residing within 2 miles of a school, (v) school fees should be 3d per week, per child, but not more than 1s for all the children in one family—parents unable to pay to have fees remitted, (vi) high schools for boys and girls might be established, in which the pupils should complete the public school curriculum, and prepare for the university; (vii) school children should travel free by railway to the nearest public school, (viii) four hours per day should be given to secular instruction and one to religious—to be given in separate class-rooms (or parts of school room) by clergymen or religious teachers from the different

denominations, to such children as the parents wished should receive it, and, if no religious teacher attend, the whole four hours to be given to secular work. The following classes of schools now exist—public schools, with pupils varying from 20 to over 600 in number, superior public schools, in which higher instruction is given to those who have completed the course of the fourth class in a public school, half time schools, which are established wherever 16 children within 10 miles of a central point can be collected into groups of not less than 8 in each—a teacher divides his time between two such schools, house-to-house schools, similarly conducted, but where the teacher divides his time between three or more, provisional schools, in remote and thinly-populated places, and evening public schools, where not less than 10 persons over 14 years of age will attend to receive primary instruction. The subjects taught include—scripture and morals, reading, writing, arithmetic, grammar, history, geography, object lessons, natural science, singing, drawing, needlework, and drill. In some schools Latin, French, geometry, algebra, mensuration, and trigonometry are taken. To gain admission to a high school an examination must be passed. In these schools are taught ancient and modern languages, literature, history, mathematics, physical science, &c. Sixty scholarships are awarded yearly, entitling the holder to grants of text books and free education for three years in a state high school. These may be completed for by any child under 14 years of age. There are also thirty full and twenty half bursaries for public school children whose parents are too poor to pay for their education. School inspectors are chosen from the ranks of the teachers, they must hold the highest qualification (includes university training), have successfully conducted a large school for several years, and have given evidence of possessing the special qualifications required for inspecting work. The local authority consists of not more than seven members appointed by the governor in council, and called a 'public school board'. Its duties are to regularly visit, inspect, and report upon the schools in their charge, to suspend any teacher for misconduct, when urgent, and to report to the Minister of Education, and to secure regular attendance, and report those parents who are neglectful.

Cape Colony—When the English first took possession of Cape Colony, in 1806, there were eight 'common Dutch schools', and a Latin school and girls' school, in existence. In the common schools Europeans, Hottentots, and slaves were taught spelling, reading, writing, arithmetic, singing, and the elements of religion (Dutch Reformed Church). A school commission was appointed, but did so little that in 1809 there were less schools and less pupils. In consequence of a report, by the chief justice, on the state of education in the country districts a circular letter was sent to the various landdrosts, requiring them to furnish reports on the matter. The school commissioners thereupon drew up a scheme for establishing 'Church Clerk Schools'—so called because the resident church clerks were, if they successfully passed a test examination held at Cape Town, to be the teachers. The money for the support of this scheme was raised by an appeal in a government minute for subscriptions, though the original intention was to impose a local tax. The fund so raised was to secure 'the incessant distribution of the Scriptures and the uniform progress of education'. This necessitated a modification of the school commission, which was renamed the 'Bible and School Commission'. In 1818 the Bell and Lancaster system of monitorial instruction was

introduced, and a school on this plan established in Cape Town. To increase the funds of two free schools in Cape Town the governor (Lord Charles Somerset) levied a poll-tax on persons attending the races at Cape Town. English was substituted for Dutch as the language of the colony in 1822, and this led to the appointment of teachers brought from Scotland, whose salaries were paid by the colonial treasury. Free schools on the monitorial system were now established in country districts. The education of coloured children was mainly provided by the various missionary societies, whose schools outnumbered all kinds of schools for white children. Two of the six teachers brought from Scotland became ministers, one was appointed professor in the South African college, and only the least competent remained as a teacher. Some of the schools were in charge of discharged soldiers. Constant representations concerning the unsatisfactory condition of education were made to the government, and in 1837 a memorandum was prepared by the secretary and submitted to the governor. The advice of Sir John Herschel, who was then residing at the Cape, was sought, and he made some comprehensive suggestions. These were approved by the English government, and a new system of education was established, which provided for a superintendent general of education, who was also the inspector of schools, 'first class' schools in several places to provide both a primary and a secondary course of instruction, and 'second class' schools in smaller places to provide a primary course of instruction. Primary instruction to be free in all cases, and a moderate fee to be paid for secondary instruction. A library was to be attached to each school, and government scholarships were to be given to poor deserving students. Clergymen of any denomination were to have the opportunity of catechising pupils whose parents desired it, but no pupil was to be compelled to attend for religious instruction. A training college for teachers was to be established in Cape Town—though no student who went through this college became a school teacher. By 1841 this system was fairly launched, and the Bible and school commission was therefore abolished. In 1843 aid was given to 'schools at eligible stations among the agricultural population of the country districts', thus being set up what were practically 'third class' schools. With the introduction of representative government, in 1854, and the close of the eighth Kaffir war, the native problem had to be considered, and industrial schools were established for the natives. A pupil teacher system was formally organized in 1859. Desire for further improvement and progress led to the appointment of a commission, in 1861, by the House of Assembly, and upon the recommendations made by it the present system has been developed.

The supreme authority for education is the 'Department of Education' in Cape Town, which has for its general policy the encouragement of local efforts for the extension and improvement of elementary education, and it endeavours to co-operate with such local efforts, it has also the duty of guiding and assisting higher education. It dispenses grants and loans for school buildings, grants towards the annual expenditure of schools, on the principle of one pound of grant for one pound of local subscription, and grants to high schools and colleges. The local authorities are in all cases what we should call voluntary managers, and may either represent a municipal board or divisional council, a religious denomination, or an undenominational party. In the case of the first named, when they have guaranteed half the estimated annual expenditure for three

years, and have complied with the ordinary requirements of the Department of Education, the members of the board or council become, in virtue of their guarantee, the managers of the school or schools which they purpose to establish or support. The board or council may, if they choose, appoint three managers, who must be approved by the governor. For the establishing of a denominational or undenominational school, a meeting of the inhabitants of the district must be called, it must by them be decided that a public school shall be established, persons of influence and means living in the district must guarantee half the estimated annual expenditure for three years, from these guarantors are chosen those who are to be the managers, and these managers prepare a scheme in which they state what school buildings they propose to erect, the names and qualifications of the teachers to be appointed, the rate of school fees to be charged, and the local regulations proposed for the conduct of the school, and the arrangements for its maintenance and management. If the Department of Education approves and accepts the scheme, it implies a guarantee that one half of the annual expenditure will be met by a government grant, in virtue of which the school must at all times be subject to visits from the government school inspectors. The undenominational public schools are classified as follows—Class I, schools in which are taught reading, writing, arithmetic, algebra, English composition and grammar, political and physical geography, outlines of history, and the elements of natural science, in the primary course, and the Greek and Latin languages, English literature, history, higher mathematics, and one at least of the specific subjects—chemistry, geology, mineralogy, botany, animal physiology principles of agriculture, in the secondary or superior course. In a girls' school (Class I) the subjects to be taught are reading, writing, arithmetic, English composition and grammar, outlines of history and geography, plain needlework, and lessons on natural objects, in the primary course, and English literature, history, political and physical geography, higher arithmetic, elements of natural science, laws of health, domestic economy, and a modern language other than English, in the secondary or superior course. To be in Class II a school must teach, in a boys' or mixed school, reading, writing, arithmetic, algebra, English composition and grammar, political and physical geography, outlines of history, Latin, and the elements of natural science. Latin may be omitted where instruction is provided in one of the specific subjects mentioned above, and in a modern language other than English. In a girls' school of Class II the subjects are reading, writing, arithmetic, outlines of history and geography, plain needlework, and lessons on natural objects. The subjects for a school to be of Class III must include at least reading, writing, arithmetic, outlines of history and geography, and lessons on natural objects. The schools in Class III correspond to our elementary schools, and are graded (in standards) in a similar manner. In addition to the subjects just mentioned the curriculum includes English grammar and composition, woodwork, drawing, singing, needlework, recitation, and physical training. Preparatory (in infants') schools are connected with public schools and receive grants. For every £20 of government grant to a Class I school, or £10 to a Class II school, the governor has the right to appoint as a free scholar one who would otherwise be unable to pay the fees. In a Class III school the governor has the right to appoint five free scholars, irrespective of the amount of grant. If the inhabitants of a

district be too poor to pay the usual school fees, the government may give extra grants, and pay school fees for certain scholars. Half the rent for school buildings and premises is paid by the government, where managers find it impossible to become possessed of the necessary land and buildings. District boarding schools are established among the agricultural population, and aided by government grants. Children whose homes are not within 3 miles of such schools, and whose parents are too poor to provide for their education, may receive grants in aid, not exceeding £12 per annum, from the government. Day scholars must be provided for in these district boarding schools. Boarding departments are attached to day schools where necessary. Aid is granted to mission schools as follows—where there is a series of schools, infant, juvenile, and industrial, the annual allowance shall be £75, where the children form only one school, £30, to schools at out stations, £15. Where a district is entirely without schools, and the people on the farms are too poor to pay for private farm schools, a circuit teacher is appointed. His salary, and a capitation fee for each scholar who passes an examination, is provided by the government, and the residents have to furnish him with free board and lodging. Private farm schools receive grants for each child under instruction of £3 or £2, according as the teacher is, or is not, certificated, and a capitation grant of 10s, 15s, 20s, or 25s, according as the children pass in the first, second, third, or fourth standards. The farm or homestead must be not less than 6 miles from a public school, and there must be at least five children under regular instruction. Grants are given to institutions and schools for the natives on condition that the teachers are properly qualified, instruction is given for not less than four hours daily, and the average daily attendance is at least one hundred. Industrial institutions receive grants. These institutions aim to encourage native youths to become skilled workmen, to which end, after a year's probation, they must engage to stay as apprentices for a period not more than four years nor less than two, in one of the following trades—carpentry, wagon making, blacksmith's work, tailoring, shoe making, printing and bookbinding. Similarly, grants are given to encourage native females to become habituated to and skilled in the performance of the duties of domestic civilized life. After three months' probation they must engage to stay as apprentices to household work for a period not more than two years nor less than one. All apprentices must receive suitable elementary education, either in the morning or evening. Boarders are received in these industrial institutions. In every case the government grant is mainly given towards teachers' salaries. Pupil teachers are employed in the schools on conditions almost exactly similar to those in England. They may begin at 13 years of age, and when 15 years of age they may take what is called the first year examination, afterwards the second and third year examinations. If they pass these examinations they obtain a third class teacher's certificate. Another examination gives the second-class teacher's certificate, at 18 years of age. To obtain a first class teacher's certificate candidates must, as a rule, possess a university degree, and have had five years' successful experience in actual teaching in a higher grade school. Teachers who have served for five years, continuously and meritoriously, in connection with the department of education, and are recommended by an inspector, become eligible for 'good service allowance' at the end of the sixth year of service. This consists of

an extra payment per year, ranging from 25 to 40 per cent of the government grant paid towards his salary (so long as this is not greater than one half of the salary), according to the length of service (40 per cent after fifteen years of service) There is a pension fund for teachers, to which they contribute 5 per cent of each payment of good service allowance and merit grant

Canada—The first school was opened in Lower Canada in 1616, and great efforts were made by the Jesuits and by the bishops of the Roman Catholic Church to establish institutions for secondary education, but not until after the conquest was there any movement on behalf of primary education Lord Dorchester, in 1787, appointed a commission of inquiry, and the result was a recommendation to institute a system modelled on that of the New England states, and embracing parish or village free schools, district or high schools, and collegiate institutes or a university, but the public mind was not ripe for this liberal outline The chief difficulty besetting successive legislatures has been the difference of population and creed, in the province of Quebec the French and Roman Catholicism predominate, in Ontario the British and Protestantism The 'common school', for pupils of different religious persuasions, has long been the *beau idéal* of Canadian statesmen, but the most strenuous exertions have failed to establish a uniform system, and the united government has been at last constrained to leave the educational administration to the governments of the several provinces The systems in use, therefore, differ somewhat in detail, but all are based on the principle of free education The funds are supplied by local taxation and government grants, except in the case of the schools of the North West Territories and British Columbia, which are wholly supported by government Except in the case of New Brunswick, education is more or less compulsory in all the provinces Separate schools for Roman Catholics are provided in Ontario, Quebec, and the North West Territories, in the other provinces the schools are unsectarian Ample provision is also made for following up the education given in the schools by colleges, universities, &c

Ontario may fairly be regarded as having the most advanced system of education in Canada There is an education department under a minister of education, who is a member of the provincial government Large powers are given to local authorities The province of Ontario is divided into counties, which are subdivided into townships, incorporated villages, towns, and cities Counties are bound to make grants, through their municipal councils, to high schools, and both counties and townships must aid public schools Each township is divided into school sections, each provided with a public school There is a 'board of trustees' for each school section The ratepayers (men and women) elect the trustees, who appoint teachers, and fix the amount to be spent on buildings, equipments, and salaries School attendance has been compulsory since 1891 for all children between the ages of 8 and 14 All public schools are free The public school (primary) course is for five years, and the syllabus for the fifth year includes reading, English grammar and rhetoric, English composition, English poetical literature, history (Canadian and British), geography (physical and political), arithmetic and mensuration, algebra, geometry, drawing, book-keeping, botany, agriculture, Latin and Greek, French and German, and manual training There is a 'public school leaving examination'. When pupils have concluded the public school course, they must pass an entrance examination if they wish to

go to a high-school or collegiate institute The examination is based on the work of the fourth year in the public school, and includes reading, drawing, writing, orthography, literature, arithmetic, grammar, geography, composition, history, and optional papers on temperance and hygiene, and agriculture To pass, a candidate must get at least one-third marks in each subject, and one-half of the aggregate number of marks, but special recommendations for admission to schools may be made by the examiners The high school course takes four years, and the syllabus for the fourth year contains the following subjects—English composition and literature, algebra, geometry, trigonometry, English and ancient history, physics, chemistry and biology, Latin, Greek, French, and German By passing examinations based on the work done in the high schools and collegiate institutes, students get certificates of 'junior leaving standing' and 'senior leaving standing' High schools may be free, or may charge fees, at the option of the local authority 48 out of a total of 128 high schools and collegiate institutes are free, the others charge fees ranging from 10s to £5, 5s a year The province has a 'school of practical science' with departments for civil engineering (including sanitary engineering), mechanical and electrical engineering, mining engineering, architecture, and analytical and applied chemistry, an 'agricultural college and experimental farm', and professional schools (law, medicine, dentistry, &c) An institution for the deaf and dumb, an institution for the blind, and an industrial school are also provided There is a provincial university at Toronto The training of teachers is carried on in three normal schools All who desire to become teachers must have a high-school course, followed by a normal school training No pupil teachers or any untrained adults are allowed to teach in the public schools Only teachers who have, by ability and success, gained a good reputation in the schools are eligible for the post of inspector of schools Teachers' institutes are subsidized by the government They have to hold one meeting each year, extending over a Friday and Saturday, during which discussion of educational topics is conducted The minister of education may also prescribe a course of reading for the teachers of public schools The course extends over three years If a teacher sends to the inspector of his district a synopsis, of not less than ten or more than fifteen pages, of each book read, and a written declaration that it is his own unaided work, this is examined by a committee consisting of the inspector and two persons appointed by the teachers' institute, and, if approved, the inspector issues a certificate for each book read If nine such certificates are submitted to the education department, the minister of education issues a diploma certifying the completion of one full reading course of three years Most of the schools and colleges are non denominational, but if the heads of not less than five families residing in a place desire to do so, they may unite and establish a 'separate school' The amount they pay in rates is given entirely to the support of such a school The Roman Catholics have 345 'separate schools', and the Protestants have 8

United States—Education in the United States originated with the 'Pilgrim Fathers', who in 1620 landed near Plymouth in the present state of Massachusetts Ten years later its capital, Boston, was founded The oldest entry in its records was made in 1634, and in the very next year the record intimates that it was unanimously resolved to appoint 'our brother Philemon Pulmont schoolmaster, for

the instruction and educating of our children', and to assign for his use and that of his successors '30 acres of land'. A few years later the General Court (the House of Representatives of that day) enjoined the local authorities to see that no family be without such instruction as should enable the children 'to read fluently the English tongue, and to acquire a knowledge of the penal laws, under a penalty of twenty shillings'. The same law enjoined 'that every town with fifty families shall support a teacher', and 'with one hundred and fifty families a grammar school' to prepare pupils for the university. The New England states, as they were successively formed, adopted the principles of these early settlers—compulsory education, free schools, local administration for their support and superintendence, and the Bible as the basis of religious instruction,—and they still represent all that is best in the educational arrangements of the United States.

There is no national system in the United States, but each state frames its own laws and administers them in accordance with local exigencies. Not until 1867 was there any government bureau of education, but it is comparatively powerless. It has no administrative functions, and although appointed 'to collect statistics and facts', it can compel no one to give them. Compulsory education cannot be described as general in the States. Not until May, 1874, did the legislature of the state of New York pass an act to compel attendance, but it goes no further than to require attendance for 'at least fourteen weeks in each year, eight weeks at least of which attendance shall be consecutive'. In the States generally there is no provision for religious instruction beyond reading the Scriptures and opening the school with prayer. The general government continues to regulate judiciously grants of land, and every one of the states has been enriched with what must yet tell most beneficially on their educational improvement. The number of acres granted or reserved for the support of common schools is no less than 75,000,000. To overestimate the importance of this far sighted policy is almost impossible, and it is worthy of notice that these large state benefactions and local taxation have not lessened the number of munificent contributions by private citizens for educational purposes. It is practically impossible to give anything like a general review of the schools in the United States because of the complete independence and self dependence of each state in school matters. It may, however, be said that everywhere both higher and primary schools are within the reach of all classes, that every kind of state institution for education is completely free from sectarian control, and that the aim in all schools is to make the training as intelligent, practical, and complete as possible. There is also a very generous provision for the thorough training of teachers, and a general attempt to unify the courses of study for schools and for entrance to universities.

State of New York—The supreme educational authority in the state is the 'state superintendent of education', who is elected triennially by the joint ballot of the senate and assembly. His duties are—to supervise normal schools, to draw up an annual report to the state legislature, to make regulations for the examination of teachers, and to grant and cancel certificates, to supervise county school commissioners and other school officers, and to regulate the state grants to school districts. There is no board of education, and his powers are, within the provisions of the law, supreme during his tenure of office. His offices are in the capitol at Albany, and

he is assisted by a large and highly-qualified staff. He has control over the management of teachers' institutes, training classes, the formation of school libraries, and the enforcing of the compulsory-attendance laws. He is a court of appeal on all matters of school law. Of the state tax levied in New York nearly £1,000,000 is devoted to education, and is spent on normal schools, teachers' institutes, training classes, museums of natural history, examiners, summer institutes, school libraries, school commissioners, compulsory attendance, Arbor day, and office expenses. School commissioners (inspectors) for non city school districts are elected by popular vote, and are removable by the state superintendent for neglect of duty. Each school commissioner divides the district over which he has charge into school districts or sections. The ratepayers in a school district elect by ballot one or three school trustees, a district clerk, a district collector, and, if they choose, a treasurer. There is an annual meeting in each district, at which the ratepayers vote taxes for erecting, hiring, and maintaining schools, and for other school purposes, which the trustees administer. But no sum exceeding £100 can be spent on such buildings unless the school commissioner certifies his approval in writing. The commissioner may remove trustees who do not see that the schools are kept clean. The method of distributing state grants is such that the wealthier districts assist the poorer. The primary schools are organized under nine grades (classes or standards), the first three being called the elementary grades, and the others the grammar grades. The subjects taught include reading, writing, arithmetic, language (English grammar and composition), geography, history, nature study, physiology and hygiene, singing, drawing, morals and manners, civil government, algebra, book keeping, manual training, and gymnastics. The law requires that every child between 8 and 16 years of age shall attend a public school, unless it is otherwise being efficiently educated. This law is applied to private schools as to public schools. Truant schools are provided for incorrigible truants. Secondary and higher education is controlled by the 'board of regents' of the university of the state of New York. This board consists of twenty five members, viz the governor, the lieutenant governor, the secretary of state, and the state superintendent of public instruction *ex officio*, and others chosen in the same manner as United States senators. They receive no salary, and are the only public officers chosen for life. They have 'power to incorporate, and to alter or revoke the charters of universities, colleges, academies, libraries, museums, or other educational institutions, to distribute to them funds granted by the state for their use, to inspect their workings, and require annual reports under oath of their presiding officers, to establish examinations as to attainments in learning, and confer on successful candidates suitable certificates, diplomas, and degrees, and to confer honorary degrees'. The board of regents conducts entrance examinations for high schools, and awards grants to such schools according to their efficiency as judged by the results of set examinations conducted by the board. The fact that something like 90 per cent of the pupils of the high schools will complete their day school education in them leads to the arranging of different courses such as English course, modern languages course, Latin science course, classical course, teachers' course, college-entrance course. In all courses except the classical the following subjects have to be taken—United States history, English history, algebra, geometry, English literature, reading and composition, rhetoric, physical geography, phy-

sology, and physics. Other subjects are Latin, Greek, German, French, ancient history, drawing, geology, botany, zoology, economics, commercial law, history of commerce, commercial geography, shorthand, business practice, typewriting, shopwork, home science, manual training, music, needlework, in the various courses. There are also optional subjects, viz book keeping, New York State history, French history, civics, economics, psychology, trigonometry, and higher algebra. Kindergartens (infants' schools) are attached to many schools, and are becoming increasingly valued. Night schools are conducted, and are attended by young men and women who desire to qualify themselves more completely for their occupations.

SCHWEGLER, ALBERT, a German philosophical writer and theologian, was born in Württemberg on Feb 10, 1819. He was educated at Tübingen (1836-40), where he became a privat docent, and subsequently extra professor of classical literature, being latterly appointed ordinary professor of his tory. He died at Tübingen on Jan 5, 1857. His *Geschichte der Philosophie* (History of Philosophy, 1848) is widely known outside Germany through the translations of Professor Seelye of Amherst and Dr Hutcheson Stirling (1872). His other chief works were *Das Nachapostolische Zeitalter* (The Post Apostolic Age, 1846), *Geschichte der Griechischen Philosophie* (History of Greek Philosophy, 1859), and editions of the Clementine Homilies, Aristotle's *Metaphysics*, &c.

SCHWEINFURTH GREEN. See **EMERALD GREEN**.

SCOTT, SIR GEORGE GILBERT, R.A., one of the most eminent of British architects, was born at Gawcott, near Buckingham, in 1811. While still a youth he exhibited an ardent desire for studying and sketching from ancient churches, which induced his father to place him under an architect. His tastes drew him mainly to the study of Gothic architecture, and to him is due in a great measure its revival in Great Britain. The Martyrs' Memorial, erected at Oxford in 1841, was the first work which brought him into notice. In the following year it was followed by the new church at Camberwell, and in the same year he was the successful competitor for the rebuilding of the church of St Nicholas at Hamburg, which had been destroyed by fire, the first important specimen of the Gothic revival erected in Germany. Among his other designs are included the cathedral church of St John's, Newfoundland, the Town Hall at Preston, the Foreign Office, the India Office, and the Home and Colonial Offices, London, Glasgow University, Leeds Infirmary, Kelham Hall, Nottinghamshire, Walten House, Warwickshire, Hafodunos House, North Wales, the Midland Railway terminus, St Pancras, London, chapels at Exeter College, Oxford, and St John's College, Cambridge, the Memorial to the Prince Consort, London, St Mary's Cathedral at Edinburgh, &c. Towards the close of his life he was engaged in carrying out the restoration of the cathedral at St Albans. Among the restorations carried on by him are those at the cathedrals of Ely, Lichfield, Hereford, Ripon, Gloucester, Chester, St David's, St Asaph, Bangor, and Salisbury, and others of less magnitude at Exeter, Peterborough, Worcester, Rochester, and Oxford. In this connection he wrote a *Plea for the Faithful Restoration of our Ancient Churches* (1850), *Conservation of Ancient Architectural Monuments* (1864), &c. He was elected A.R.A. in 1852, and R.A. in 1860, and was knighted in 1872. He died March 27, 1878.

SCOTT, MICHAEL, author of *Tom Cringle's Log* and *The Cruise of the Midge*, was born at Glasgow

on Oct 30, 1789, and was educated at the high-school and university of his native city. From 1806 till 1822 he resided mostly in Jamaica, engaged in commerce and agriculture, but in the latter year he finally settled in Scotland, and embarked in commercial affairs. He died in Glasgow on Nov. 7, 1835. The two brilliant sea novels of which he was the author appeared anonymously in *Blackwood's Magazine*. *Tom Cringle's Log* ran in the magazine from Sept 1829 till Aug 1833, and first appeared in book form at Paris in 1836. *The Cruise of the Midge* ran from March 1834 till June 1835, and also appeared for the first time in book form at Paris in 1836.

SCOTT, WILLIAM BELL, brother of David Scott, the painter, and himself a painter, etcher, engraver, archaeologist, and poet, was born at Edinburgh on Sept 12, 1811. He was educated in the High School of his native city, and received his art training first at home under his father, and afterwards at the Trustees' Academy. For a short time he assisted his father in his engraving business, but in 1837 he removed to London, where he gained a somewhat precarious livelihood as etcher, engraver, and painter. From 1842 till 1869 he exhibited pictures in the Royal Academy. In 1844 at the request of the Board of Trade he established a school of art at Newcastle on Tyne, and was until 1885 art examiner under the Education Board. His published poems, mostly modelled after the style of Blake and Shelley, include *Hades* (1838), *The Year of the World* (1846), *Poems by a Painter* (1854), *Ballads, &c.* (1875), and *Harvest Home* (1882). Other works are *Antiquarian Gleanings* (1861), *Lectures on Art* (1861), *Albert Durer, His Life and Works* (1869), *The Little Masters* (1879), *Life and Works of David Scott*, &c. He died on Nov 22, 1890.

SCOTT WINFIELD, commander in chief of the United States army, was the son of a Scottish Jacobite, and was born near Petersburg, Virginia, on June 13, 1786, died at West Point on May 29, 1866. He was brought up to the law, and admitted to the bar, but never practised. Entering the army as captain of light artillery in 1808, he served with distinction in the war of 1812-14, and in 1814 he was promoted to the rank of brevet major general and awarded a gold medal by Congress. He visited Europe in 1815-16, and studied military science at Paris. In 1832 and the following years General Scott was employed in operations against the Indian tribes, and in 1841 he was appointed commander in chief. His fame rests upon his brilliant conduct of the Mexican war of 1846-47, in which he gained several victories over Santa Anna, made himself master of Mexico, and concluded an advantageous peace. He was twice an unsuccessful candidate for the presidency. On the outbreak of the great civil war he remained true to the Federal government, but was too infirm to take any actual command. He retired from active service in 1861, and in 1864 he published his autobiography.

SCRIVENER, FREDERICK HENRY AMBROSE, English biblical scholar, was born in London on Sept 29, 1813, and educated at Trinity College, Cambridge, where he took the degree of M.A. in 1838. From 1846 till 1856 he was head master of Falmouth School and incumbent of Penweris, and he retained this living till in 1862 he was presented to the rectory of Gerrans, Cornwall. In 1870 he was appointed a member of the Company of Revision of the New Testament, and in 1872 he was granted a pension from the civil list in recognition of his services in connection with biblical criticism. In 1875 he became vicar of Hendon,

Middlesex, and prebendary of Exeter. He died at Hendon on Oct. 30, 1891. He was LL.D. of St. Andrews (1872) and D.C.L. of Oxford (1876). He took high rank in the philological criticism of the New Testament, on which he published some valuable works, beginning with an edition of the Greek text in 1858, executed after collating about a score of unexamined manuscripts. His chief work was his *Plain Introduction to the Criticism of the New Testament* (1st edn. 1861, 2nd 1874, 3rd 1883, and 4th 1894).

SEA ACORN. See *BALANUS* in SUPP.

SEACOMBE, an ecclesiastical district of Walsley parish, Cheshire, forming a suburb of Birkenhead, is a favourite place of residence for the merchants of Liverpool.

SEA DACE. See *BASS* in SUPP.

SEA EGG, the sea urchin. See *ECHINUS*.

SEAFORD, a small town of England, in the county of Sussex, 3 miles S.E. of Newhaven, now a popular seaside resort. Near it are the remains of an ancient camp and cemetery. It sent two members to parliament from 1298 till 1832. Pop. (1891), 2,425, (1901), 3,355.

SEA HEDGEHOG. See *ECHINUS*.

SEALING-WAX, a resinous preparation used for securing folded papers and envelopes, and for receiving impressions of seals set to instruments. Ordinary red sealing wax is made of pure bleached lac, to which when melted are added Venice turpentine and vermilion. Inferior qualities consist of a proportion of common rosin and red lead, and black and other colours are produced by substituting appropriate pigments. Sealing wax was invented in the seventeenth century. See *LAC*.

SEA PINK (*Armeria maritima*), a small plant, the type of the genus *Armeria*, belonging to the natural order Plumbaginaceae. It is found on all the coasts of Britain, and on many of the mountains. In gardens it is often used as an edging for borders in place of box.

SEA URCHIN. See *ECHINUS*.

SECCHI, ANGELO, Italian astronomer, was born at Reggio nell'Emilia on June 29, 1818, and early joined the order of Jesuits. After teaching in various Jesuit colleges, including that at Washington, U.S.A., he was in 1849 appointed professor of astronomy and director of the observatory at the Collegio Romano. He died in Rome on Feb. 26, 1878. Father Secchi's services to astronomy were of the utmost value. He made a careful study of the sun, especially with regard to its physical constitution, the nature of sun spots, and the solar prominences, but of much greater importance was his pioneer work, carried out with less perfect instruments contemporaneously with that of Huggins (see SUPP.), in stellar spectroscopy or astrophysics. He made the first systematic spectroscopic survey of the heavens, and proposed a classification of stellar spectra under four main types, which has proved a valuable basis for subsequent research. Among his published works are *Quadro fisico del Sistema Solare secondo le più recenti Osservazioni* (1859), *Catalogo delle Stelle di cui si è determinato lo Spettro luminoso* (1867), *L'Unità delle Forze fisiche* (1869), *Le Soleil* (1870), and *Le Stelle* (1877).

SEDALIA, a town of the United States, capital of Pettis county, Missouri, 189 miles west of St. Louis, is a railroad centre and the seat of the machine shops and carriage factories of two railroad companies. Pop. (1890), 14,068.

SEDAN, SEDAN CHAIR, a covered chair for carrying one person, borne on poles by two men, and differing from the litter or palanquin in that the

traveller was carried in a sitting posture. It is said to have taken its name from the town of Sedan in France. It was introduced into England in 1581, and was very fashionable during the reigns of Anne and the early Georges, but almost entirely disappeared at the beginning of the nineteenth century on the introduction of the cab.

SEDGEMOOR, a marshy tract in Somersetshire, England, about 5 miles south east of Bridgwater. Much of it has been drained, but a considerable part still consists of moorland covered with bog myrtle and heather. On July 6, 1685, it was the scene of the battle in which the Duke of Monmouth was defeated by the troops of James II.

SEDGLEY, a town of West Staffordshire, England, 3 miles south from Wolverhampton. The manufacture of rivets, nails, chains, fire irons, locks, and iron safes gives employment to a large number of hands. The district abounds in coal, lime, and ironstone. Pop. (1891), 11,961, (1901), 15,951.

SEDIMENTARY ROCKS. See *GEOLOGY*.

SEDLEY, SIR CHARLES, one of the 'wits' of the Restoration period, and a great favourite with Charles II., was the son of Sir John Sedley of Aylesford, Kent, was born there in 1639, and died in 1701. He was educated at Wadham College, Oxford, but did not graduate. He wrote comedies and songs, of the latter one or two are still popular, but the former are not equal to his reputation. His first comedy, *The Mulberry Garden*, partly founded on Molière's *École des Maris*, was published in 1668, and amongst his other works of this class are *Bellamira* or *The Mistress* (1687), a gross but clever work, based on the Eunuchus of Terence, and *The Grumbler*. In later life he entered parliament and took an active part in politics. He uniformly opposed the unconstitutional policy of James II., and was one of the chief promoters of the Revolution.

SEELEY, SIR JOHN ROBERT, English writer and scholar, son of a publisher, was born in London on Sept. 10, 1834. Educated at Stanmore and the City of London School, he entered Christ's College, Cambridge, in 1852, and graduated practically as first classic in 1857. He was appointed a fellow and classical lecturer in his college, but in 1859 he went to the City of London School as classical assistant, and four years later he was chosen professor of Latin in University College London. In 1869 he succeeded Kingsley in the chair of modern history at Cambridge, and this post he held till his death, which occurred at Cambridge on Jan. 13, 1895. He was elected fellow of Gonville and Caius College in 1882, and in 1894 was created KCMG. Seeley's chief works fall into two classes: those dealing with religion and those dealing with history. To the former class belong *Ecce Homo* (1865), a rationalistic and sympathetic study of the life of Jesus, in which the supernatural is ignored, and *Natural Religion* (1882), in which he seeks to extend the meaning of the word 'religion' so as to eliminate from it not only all supernatural but also all ultra-scientific elements. Both works were published anonymously, and both, but especially the former, led to some controversy. Dr. Parker's *Ecce Deus* is a reply to *Ecce Homo*, and the excellent introduction to Martineau's *Study of Religion* is mainly a reply to *Natural Religion* from the standpoint of theological liberalism. Seeley's historical works are: *The Life and Times of Stein*, or Germany and Prussia in the Napoleonic Age (1878), probably his most valuable book, *The Expansion of England* (1883), in which he describes with great lucidity and ability the course of the English struggle with France between 1688 and 1815, *A Short Life of Napoleon I* (1885), *The Growth of British Policy: an Historical Essay*

(1895), and *Lectures on Political Science* (1895). He also published *David and Samuel*, with other Poems, Original and Translated (1859), under the pseudonym John Robertson, *Lectures and Essays* (1870), the first book of *Livy*, with an Introduction, *Historical Examination*, and *Notes* (1871), *English Lessons for English People* (1871), in co-operation with Dr E A Abbott, and *Goethe reviewed after Sixty Years* (1893).

SE GAN FOO, the capital of the province of Shen se, in the north west of China. It was long the capital of the empire, and is still of great importance, silk, tea, and sugar being the principal articles of commerce. Pop estimated at about 1,000,000.

SEGNÍ, a town of Italy, in the province and 40 miles south east of Rome. One of the oldest Italian cities, it contains some interesting remains of antiquity, such as fragments of cyclopean walls, and an ancient gate. The cathedral is a very fine building. Pop 5600.

SEISIN, SEIZIN, in law, possession of the freehold. Seisin is of two sorts, seisin in deed or fact, and seisin in law. Seisin in deed or fact is actual or corporal possession, seisin in law is when something is done which the law accounts seisin, as enrolment, or when lands descend to an heir but he has not yet entered on them. The corresponding term in Scotch law is 'sasine', which, like seisin in England, recent legislation has made of little legal importance. See **SASINE** in SUPP.

SEISMOMETER, an instrument for measuring the force and direction of earthquakes and other earth movements. It records both the horizontal and vertical movements by means of an index, the record being traced on smoked glass. There are various forms of seismometer or seismograph. One which is used in the observatory on Mount Vesuvius consists of a delicate electric apparatus, which is set to work by the agitation or change of level of a mercurial column, which records the time of the first shock, the interval between the shocks, and the duration of each, their nature, whether vertical or horizontal, the maximum intensity, and in the case of horizontal shocks the direction is also given. Amongst the best instruments of this class are those of Gray and Milne, and of Professor Ewing.

SELAGINELLA, a genus of plants allied to club mosses, readily distinguished from the genus *Lyopodium* by their flat stem with leaves in four rows. They form the type and only genus of a family of heterosporous vascular cryptogams, and are amongst the highest of the so called flowerless plants. The number of species is between three and four hundred, mostly natives of warm climates, and often cultivated. Only one species occurs in Britain, namely *S. selaginoides* (or *spinosa*).

SELANGOR, a native state of the Malay peninsula, south of Perak, occupying the coast territory between Malacca and Dinding, under the protection of the British colony of the Straits Settlements, area, 3500 square miles. It yields tin, gutta percha, &c. Since 1880 the British resident resides at Kuala Lumpur, 22 miles distant from Klang, the principal port, with which it is connected by railway. The

sultan resides at Jugra. Pop 122,000, more than half of whom are Chinese.

SELBORNE, ROUNDELL PALMER, first EARL OF, English lawyer and statesman, son of an Anglican clergyman, was born at Mixbury, Oxfordshire, on Nov 27, 1812. He was educated at Rugby and Winchester College, and in 1830 matriculated from Christ Church, Oxford. After an exceedingly distinguished career at college, during which he gained the Newdigate prize, the chancellor's prizes for Latin verse and a Latin essay, the Ireland Greek scholarship, the Eldon law scholarship, and other honours, he graduated in 1834 with a first in classics, and proceeded M A in 1836. In 1837 he was called to the bar at Lincoln's Inn, of which twelve years later he was elected a bencher. In 1847 he was elected to the House of Commons by Plymouth as a Peelite, and in 1861 he became solicitor general under Lord Palmerston. Two years later he was appointed attorney general, but he went out of office with his colleagues in 1866. He was not included in Gladstone's 1868 ministry, because of his opposition to its Irish church policy, but in 1872 he was appointed lord chancellor. He had been knighted in 1861, and soon after his elevation to the wool sack he was created a peer by the title Baron Selborne of Selborne. In 1873 the great act establishing a supreme court of judicature, to which he had contributed much, was passed, but on the fall of the ministry in 1874 he went out of office. In 1880 he again became lord chancellor, and two years later he was created Viscount Wolmer and Earl of Selborne. He separated from Mr Gladstone in 1886 on the question of Home Rule, and after that date his chief political work consisted in legal reform and opposition to Welsh disestablishment. He died at his residence of Blackmoor, near Petersfield, in Hampshire, on May 4, 1895. Selborne was the ablest equity pleader of his time, and one of the most brilliant holders of high judicial office. In parliament he always showed himself strongly conservative on church questions, and some of his publications give evidence of his sincere devotion to the church. Such are *The Book of Praise* (1863), in the Golden Treasury Series, *Notes of Some Passages in the Liturgical History of the English Church* (1878), *A Defence of the Church of England against Disestablishment* (1886), *Ancient Facts and Fictions concerning Churches and Tithes* (1888), and *Hymns their History and Development in the Greek and Latin Churches, Germany, and Great Britain* (1892), reprinted from the *Encyclopædia Britannica*. In 1860 he was elected a fellow of the Royal Society, and he received various honorary degrees and other honours. His Memorials were published in 1896-97.—His son and heir, **WILLIAM WALDEGRAVE PALMER**, second EARL OF SELBORNE, born in 1859, is married to a daughter of the Marquis of Salisbury. He sat in the House of Commons as member for East Hampshire from 1885 to 1892, at first as a Liberal and then as a Liberal Unionist, and as member for West Edinburgh during 1892-95. In 1900 he was appointed First Lord of the Admiralty, after having been under secretary for the colonies in 1895-1900.

